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ABSTRACT

This publication is the report of the first phase of the Urban Technologists Development Program at Youngstown State University. This phase involves a National Science Foundation supported study of college curriculum needs for urban technologists education. A survey (Appendix C) of urban planners and public works directors across the country was conducted and the data were analyzed to determine the job skills needed by urban technologists. Also, trial instructional units and tentative curricula were developed based on this data. Included in the contents of this publication are educational modules designed to serve as a guide in the development of an Urban Technology Curriculum. Of the 18 modules included, selected titles are: (1) Formal Communications; (2) Computers in Planning; (3) Planning Modules and Analysis; (4) Planning Law-Micro Controls; (5) Urban Economics; and (6) Public Systems Development/Facilities. Also included in this publication are sections discussing: (1) Course material testing; (2) Review and evaluation; and (3) Dissemination of results of this study. (MR)

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URBAN TECHNOLOGIST
DEVELOPMENT PROGRAM

Phase-I March 1977

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URBAN TECHNOLOGIST DEVELOPMENT PROGRAM - PHASE I

AN EDUCATIONAL DEVELOPMENT PROGRAM

SUPPORTED BY

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URBAN TECHNOLOGIST DEVELOPMENT PROGRAM

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URBAN TECHNOLOGIST DEVELOPMENT PROGRAM - PHASE I

PREFACE

Inter-related environmental and social problems of an increasingly complex nature face society today. These problems, often called Urban problems, are just as prevalent in suburbia and rural America. Urban Technology presents a method of educating people to help understand and alleviate these problems. Urban Technology education provides basic training in the environmental and social sciences as well as training in the specific skills needed for urban problem solving. Such skills might include how to collect primary data or to research government documents, to analyze and present the resulting information in form for decision making, cost estimating and cost effectiveness techniques for alternate problem solutions, building and zoning interpretation and implementation, and many others.

The Urban Technologist Concept. It had been our experience that the majority of persons employed in Urban work fell into one of four broad categories and that they did not communicate well with each other. Thus urban problems remained not only unsolved but undefined. These categories are: 1) the social scientist or social planner and his coworkers who share greatest concerns for the immediate welfare of humans with many varied problems, 2) the "physical" planner who relates primarily to the aesthetic and functional nature of our physical environs, 3) the engineer who has a reputation for being able to design anything conceived by others but who is generally not given the opportunity to conceptualize physical systems that are aesthetic and functional and which provide immediate and long-range solutions to human problems, and 4) the untrained (often political) appointee.

These groups truly represent an unholy alliance. It is no wonder that the technological and systems sciences advance which have revolutionized many segments of the private sector have not found application to urban problems. Few on the regional or local urban scene can visualize what the problems are, let alone evaluate alternative methods of alleviating or moderating them.

The original concept of Urban Technology was not to replace the professional categories discussed above, but rather to produce a technologist who could work with and support any of those groups in many governmental agencies and private firms in the urban area. Typically, the urban technologist would be so broadly trained in the fundamentals of science and in the skills necessary to produce problem solutions that he would be the key communication link among the professionals in various urban functions. Because he would not be a fully trained social scientist, planner, or engineer, we calculated the role of the technologist as supportive or paraprofessional. However, our advisory committee and the results of our extensive national survey indicate that the Urban Technologist would represent a new professional on the urban scene -- one truly needed.

Project Support. We knew that the Urban Technologist needed basic education in the environmental sciences and societal systems and that he needed basic computational or analysis skills to carry out public planning and systems development tasks. These curricular elements would help assure that the individuals would remain viable in a changing America. However, (1) what specific skills would the technologist most likely apply in his various job functions and

(2) how could these be woven into curricula universal enough to be adapted to various institutions of higher learning? To help answer these questions, we obtained support of a nationally based advisory committee composed of individuals from government agencies, private firms and professional societies. A full list of participants is shown at the beginning of this report. A brief description of the participation of these persons and groups are agencies is given in the Review and Evaluation section of this report. With the help of these advisors and the prestige of National Science Foundation support, we were able to determine the degree of need for the Urban Technologist and the basic tools and applied skills he should possess.

Summary. In brief summary, under this contract we accomplished the following:

1. Determined those educational programs now available which are similar to our basic concept of Urban Technologist Education. We found few, if any such programs. This is discussed in a later section of this report.

2. Determined what special educational tools or instructional segments now available which might be applicable to the survey were not particularly positive, as also discussed later.

3. With the help of our advisory committee and consultants, developed, administered and analyzed an extensive national survey of the applied tools and comprehensive skills needed in the various agencies and private firms (public works, municipal engineering, regional planning, COG's, municipal planning, consulting planners and engineers, zoning, housing) which would employ the Urban Technologist. This is discussed in detail in Section II of this report.

4. Again with the help of our advisory committee and additional consultants, curricular outlines were developed for the core modules which were reflected from the study. These modules are included in Section IV of this report.

5. Educational Materials Testing. Since this project started in the infancy of the Urban Technologist concept, our main thrust was on _if_ and _what_ this new product, the Urban Technologist, should be. A few courses were taught as a test bed for materials developed in the study, however. Other courses were modified significantly using study results. Other new courses have been adapted or are planned for near future adoption as a result of the study. These are all discussed in Section VI of this report.

Further Plans. With or without continued outside support, YSU will continue the development of Urban Technology. Appendix A of this report shows a brochure describing eight programs at Youngstown State University which have been initiated or revised under the Urban Technologist Development Program-Phase I. If further outside support is received, we will emphasize the national scope of the Urban Technologist Concept through continued and expanded surveys of skills needs and with continuing education programs with nationally based organizations in public works, planning and building and zoning. We will detail the educational modules to the level where they can be easily adapted in various institutions of higher learning to replace or alter present educational patterns in many planning, engineering and technology programs.

URBAN TECHNOLOGIST DEVELOPMENT PROGRAM - PHASE I

BACKGROUND

As this nation continues to urbanize, attempts have been made to regularize and control urban expansion. In the academic realm, these attempts have followed a logic similar to that stated below:

> If we think long enough, ask the right questions, and issue profound statements, utopia will happen.

A visit to a major American city should quickly dispel that myth. Indeed, the prospects for most of our cities are certainly nonutopian.

For too long the scholar-researcher-teacher (an infrequently encountered combination, but a good model) has resposed in the ivory towers thinking grand thoughts, asking the right questions, pronouncing profound declarations and producing graduates capable of the same. This country is blessed (or beset) with hundreds of institutions of higher education which annually turn out thousands of thinkers, questionners, and pronouncers. Unfortunately, these graduates can do little else. When confronted by the problems of the real world, they find they are not trained to cope with such questions.

Melvin R. Levin has captured the essence of this problem as it relates to the planning profession.

> The trouble with America's graduate schools of planning is that they are not teaching young people to be planners. This is not the same as saying that the curricula are "irrelevant," to use that much-overused phrase from the sixties. The schools seem to be going out of their way to be with it. No, I'm not talking about the focus of professional education. I'm saying that the planning school graduates have not been given sufficient technical training of any type to make them employable in today's tight job market.
> Much of the blame for that failure must fall on the planning school faculties. They can't teach planning because they have not spent enough time in the real world of planning agencies and consulting firms. They have given their energies to earning Ph.D.'s and writing scholarly tomes, not drafting and implementing zoning ordinances. If they can't teach their students how to do the practical work of a planner, it's because they've never been real planners themselves.[1]

Such an indictment of the educational system is not new. However, attempts to effect changes in it are all too rare. Technical education (long and still an ugly stepchild in most academic circles) is an attempt to overcome the shortcomings noted above. Technical education aims to produce thinkers who are doers. This report discusses research aimed at developing an educational program to produce a thinker-doer, identified as an urban technologist.

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[1] Levin, Melvin R., "Why Can't Johnny Plan?," Planning, September, 1976, p. 21

In 1970, Youngstown State University established a Center for Urban Studies in recognition of the obligations of the University for the continuous development and progress of the region. The primary objective of the Center is to relate the resources of the University to the problems and processes associated with urbanization in our region, through the development of an on-going program of urban applied research, technical assistance and training to local government business and public service organizations. During the next several years, several departments at Youngstown State University began to cooperate in interdisciplinary program development in Urban areas. In 1974 the Departments of Geography and Civil Engineering Technology proposed to the National Science Foundation a study to develop a curriculum to produce a technically competent individual to assist planning and public works agencies in improving the quality of life in our area as well as the nation as a whole.

The proposal grew out of realization that most public works and planning agencies are and will continue to be staffed by professional planners and engineers. However, when large numbers of professionals are employed, there is a need for an even larger number of supportive technicians, e.g., studies indicate that each engineer requires two or three technical support persons.

Consultation with directors of public works and planning agencies suggested a similar relationship existed in their fields. Data arising from this study supports the contention that there is a need for individuals with combined technical expertise in both engineering and planning to fill support positions in a variety of public and private organizations. Accordingly, we proposed to produce a model curriculum for educating the Urban Technologist. The technologist would be trained in the sciences, math, and social sciences at the undergraduate level for entry into the work force as a paraprofessional with practical skills and experience in the day to day operation of government agencies. His training would emphasize the applied as opposed to the theoretical aspects. Such training would provide for immediate job entry into a highly needed area of activity, but at the same time, provide a base for upgrading to a fully professional level through graduate work.

Youngstown State already had several programs directed toward producing an urban-oriented technician. In 1971, the University developed an urban intern program. This program, funded by federal,state and local governments along with private contributions combined academic study and credit with a governmental agency work experience. The success of that program and the placement of many participants with local agencies after graduation served to underscore our interest in developing a technically oriented program.

For several years the departments of Civil Engineering Technology and Geography had been working toward developing an interdisciplinary course of study aimed at training students in the practical skills that potential employers required. A logical step in that direction was the participation in a proposal to NSF to fund development of the same.

The Ohio Board of Regents has also recognized the need to develop programs in technical education. Accordingly, the Board states:

> New specialties of work are appearing in our highly technical society, thus it is incumbent upon our post-secondary institutions to produce the unique kind of education . . . needed to develop new and skilled technical manpower. The prime purpose of technical education is to prepare an individual for a career as a technician who would work with the skilled craftsman and the professional.

Pursuant to this directive, one objective of the Youngstown State University College of Applied Science & Technology is to provide, through conjunctive efforts with other colleges of the University, educational programs whose chief aim is to prepare students for immediate job entry into various vocations and paraprofessions. In fulfilling its role as a state university, Youngstown State University must continually evaluate needs for technicians and make recommendations to the State of Ohio. This appraisal of programs must be conducted on a frequent basis as the demands for technical skills are affected by the rapidly changing patterns of American life.

Presently, the State Board of Regents identifies technical programs in the following categories:

Business Technology
Health Technology
Engineering Technology
Natural Science Technology
Public Service Technology

The object of the latter category, Public Service Technology, is to provide governmental agencies with technically trained people who will assure competently and economically administered community services. As America turns more from durable goods production to services, so must our technology be translated to provide sound bases for the services.

To further identify our area of interest, we have subdivided the Public Service Technology category as follows:

Health and Educational Services
Security and Welfare Services
Public Works Services
Planning and Systems Services

Currently, the University has technical programs in the first two categories. We proposed to develop the latter two categories.

We found that in this region and in others, relatively few persons are being prepared to give technical assistance in planning and improving urban living. Renewal of housing and institutional facilities, mobility in the threat of energy shortages, provision for sanitary services with decreasing revenues and increasing costs are examples of problems requiring persons able to apply basic technology to people-oriented problems. The education of these persons must allow them to adapt to the constant state of change and challenge.

In response to the demands for people to staff planning and public works agencies, many educational institutions have "geared up." Understandably, there have been and are diverse opinions concerning how such persons should be trained and what their area of expertise should be. Such curricula are generally offered at the post-baccalaureate level. Infrequently, they are encountered at the undergraduate level and, to our knowledge, only in rare instances in the case of two-year or four-year technology programs. Where undergraduate programs are found, they generally consist of nonintegrated, disjunct courses taught in a variety of disciplines or strictly in the engineering school. Apparently, a student is not intellectually mature enough to cope with urban environments until he has matriculated in a graduate program. This is faulty logic. It is impractical to wait until a student has run the gamut of undergraduate education before he is allowed to deal with the complexities of urbanism. Valuable time and resources are being wasted.

Summarizing, in response to what we think are shortcomings in existing programs and what we perceive to be a high level of demand, this research has developed model curricula for the education of the Urban Technologist. Core programs of science and math are available to provide a strong base for the curriculum. Related engineering technology courses are available in most technical colleges, as are social sciences, economics, etc. However, it remained to develop a core and to integrate the total into workable curricula. Pursuant to that objective, we undertook the research discussed in the remainder of this report.

SECTION I

REVIEW, TESTING & EVALUATION OF EXISTING INSTRUCTIONAL MATERIALS

A continuous task in the project was to review, evaluate, and test existing instructional materials that might relate to urban technical education. Work on this task centered mainly on the review and evaluation.

The initial work began with an attempt to develop information on existing programs in the areas of planning, public works, and building inspection. Our objective was to determine the nature and extent of existing two-year and certificate programs. Some fifty programs were identified and inquiries were made concerning their content. Fifteen responses were received. Most indicate programs were not fully developed or that they had been terminated for lack of student interest. Based on the information received, the best developed and most active programs were those operated in Canadian schools. The lack of well-developed programs in the United States suggest that a research effort such as ours could fill an important gap in the field of technical education.

As a second part of this task, the staff examined some of the technical education instructional materials that had been developed under the auspices of the National

Science Foundation. Among the materials examined were: CHEMTEC, Nuclear Modules Project, CALC Math Project, Electronic Technology Project, and LANDUSE. This review was helpful in orienting the staff toward the methods, style, and level of instruction that might be employed in an urban technology program.

The review process also involved an examination of the educational and training programs of professional organizations. Three organizations were examined. They were the American Institute of Planners, the American Public Works Association, and the Building Officials and Code Administrators International. All of these organizations operate training or certification programs. Review of their approaches to technical education was considered important in the design of an in-service element for the urban technology curriculum.

The final area of review under this task was that of traditional instructional materials. The objective of this review was to select from traditional material those which seemed to offer the best coverage of topics related to technical education. Textbooks for the urban technology related courses to be offered during the contract period at Youngstown State University were examined. New adoptions were based on how material met the needs of technical education. Included in this review was an examination of simulation and gaming instructional strategies. Several games and simulations were selected for classroom testing during the course of the contract. These included materials from the urban, environmental and economics units of the High School Geography Project, the Community Land Use Game, Much Ado About Marbles, Cities, Black-White, and SLUDGE.

Summarizing this task, we find the following:

1. There are few urban technology related programs in operation. Most two-year certificate programs in planning, public works, and building inspection in the United States have not been highly successful.
2. The format and style of NSF funded technical educational strategies is adaptable to a curriculum in urban technology.
3. Existing educational and training programs of professional organizations offer an excellent model to follow in instituting in-service training in urban technical education.
4. Current instructional materials can be used in courses related to urban technical education; however, development of materials specifically designed to teach skills is absolutely necessary.

SECTION II

QUESTIONNAIRE AND SAMPLE DESIGN

A basic premise in developing curricula for the urban technologist was to develop programs not on what we perceive as needs, but on the skills potential employers saw as key to the operation of their firms or agencies. To assess the needs of potential employers a survey instrument was designed. This instrument is discussed below.

The initial development of the instrument began with several staff conferences to identify a broad range of technologist's skills. The list was reviewed with local practitioners in the fields of planning and public works. Their inputs were utilized to modify the list in light of experiences with the day to day operations of a firm or agency. The list was then discussed with several of the project's consultants and members of the Educational Advisory Committee.

Utilizing the inputs discussed above the staff designed a survey instrument for pretesting. This instrument is shown in Appendix B. The pretest instrument was distributed to a randomly drawn sample of fifty planning and public works practitioners in

Northeast Ohio and Western Pennsylvania. Twenty-seven questionnaires were returned and of those, twenty-five were sufficiently completed to be analyzed. The data on the return questionnaires was coded, punched and analyzed using SPSS. This procedure was helpful in the design of the analysis techniques for the actual survey.

The results of the pretest survey were presented to a meeting of the project's steering committee held September 5, 1975, on the Youngstown State University campus. The steering committee, some twenty practitioners, educators and consultants to the project suggested changes in the content and format of the instrument. These suggestions were incorporated by the staff in an instrument and sent to the members of the steering committee for final review. The same document was also reviewed by several persons in the field of public opinion research. Following this exhaustive review process, the survey instrument was finalized and prepared for distribution. The completed questionnaire is shown in Appendix C.

Two strategies were followed in designing a sample for the needs survey. The first was to identify nationally representative populations and secondly, four specific regional target areas. The characteristics and rationale for these two subsets in the sample are discussed below.

As stated in the project's proposal, one task was to assess the national need for specific skills and the potential demand for technologists. After thorough investigation and review, it was decided that the most representative group for surveying would be regional councils. Regional councils are A-95 clearinghouses in the application process for federal funding. As such councils are responsible for making recommendations on most major expenditures for planning and public works projects in the country. Moreover, most councils have specific planning functions that are related to comprehensive regional plans and integrating capital improvement programs. Finally, owing to their increasing responsibility, councils have been ready markets for persons trained in planning and public works related disciplines. The staff thought these characteristics made councils a logical choice for providing a national element for the survey.

The 1975 membership list of the National Associations of Regional Councils was used to identify the population for sampling. A total of 664 councils hold membership in the Association. Of these one-half, 332, were randomly selected for surveying. The return rate from this group, forty-nine percent, was exceptionally high for a mail survey. One explanation may be the interest of such organizations in a technologist training program.

The second population used to draw a national sample arose out of a concern with the low return rate from public works agencies in regional target areas. It was thought the instrument's emphasis of planning skills may have contributed to the low participation rate. To obtain a better input from public works agencies it was decided to survey public works directors of major cities. Using the 1970 Census of Population, the one hundred largest Central Cities in the country were identified. Fifty were selected randomly. The name and address or each city's public works director was obtained from one of two sources, the 1975 Municipal Yearbook or the 1975 Directory of the American Public Works Association. In most cases, one source served as a check on the other, but not all public works directors were listed in the APWA's Directory. Owing to the small size of this group, no meaningful analysis can be made of them as a subset. Instead, they were aggregated with public works returns from the regional sample for analysis purposes. Data on the elements of the national subsets of the sample are shown in table 1.

Four regional target areas were selected. The idea of target areas was endorsed by the project's steering committee. These areas were selected because institutions or individuals participating in the project had expressed an interest in developing technologist type programs within these areas requires the demonstration of a need. One objective of the survey was to ascertain the extent of that need in each area as well as to determine if differences occurred in the types of skills that might be required in each. The target regions selected were central Arizona, southeast Nebraska, east central Wisconsin and northeast Ohio-western Pennsylvania.

TABLE 1

Sample Characteristics: National Sample Elements

	Questionnaires Sent	Questionnaires Returned	% Returned
Regional Councils	366	180	49
Public Works Agencies	50	14	28
TOTALS. . .	416	194	47

Sample Characteristics: Regional Sample Elements

	Questionnaires Sent	Questionnaires Returned
Arizona	64	32
Nebraska	57	15
Ohio	197	25
Pennsylvania	171	24
Wisconsin	33	7
TOTALS	524	103

Counties were used as an areal unit to identify the extent of target areas. Universities were selected as the core of each region. Consultants to the project who were familiar with the target regions assisted the staff in drawing boundaries around each study area. Two general criteria were employed in defining the regions. First, we sought to identify the major tributary areas of each university in terms of their student bodies. That is, we attempted to include the area around a university from which it draws most of its students. Secondly, attempts were made to limit the extent of the regions on the basis of economic ties. To be included in a region, a county had to be economically tied to the county where the nodal university was located. A list of regions and the counties in each is shown in Table 2.

The strategy applied to these areas was to question as many potential employers as possible. The mailing list for each target area contained names of planning and public works agency directors, and related consultants. These lists were drawn from the Municipal Yearbooks for 1974 and 1975, state and local directories of public officials, and the membership rosters of two professional organizations, the 1974 American Institute of Planners Membership Directory and the 1975 American Public Works Association Directory. A total of 524 individuals, agencies, and firms were identified in this manner. They constituted the population to be surveyed in the target areas. Return rates for the regions and by data sources are shown in Table 3.

TABLE 2

Counties in Regional Target Areas

Region	Core University	Counties
Arizona	Arizona State University	Gila Pinal Maricopa Yavapai
Nebraska	University of Nebraska - Lincoln	Butler Colfax Dodge Douglas Gage Hall Lancaster Otoe Sarpy Seward York
Ohio	University of Akron Youngstown State University	Ashland Ashtabula Columbiana Cuyahoga Erie Geauga Huron Jefferson Lake Lorain Lucus Mahoning Medina Ottawa Portage Sandusky Stark Summit Trumbull Wayne

Pennsylvania	University of Akron Youngstown State University	Allegheny Armstrong Beaver Butler Cambria Crawford Erie Fayette Indiana Lawrence Mercer Washington Westmoreland
Wisconsin	Oshkosh State University	Brown Calumet Dodge Fond du Lac Outagamie Ozaukee Portage Sheboygan Waupaca Waushara Winnebago

TABLE 3

Sample Characteristics: Return Rates by Data Sources

Informational Source	Questionnaires Sent	Questionnaires Returned	% Returned
State Government Directories	171	36	21
1974 AIP Membership List	48	18	38
1974 AWPA Directory	47	15	32
1975 Municipal Yearbook	200	20	10
1974 Municipal Yearbook	58	14	24
1975 Membership List ARC	366	180	49
Central Cities	50	13	26
TOTALS	940	296	31

Examination of the tables indicates that the return rates when viewed by the data sources also fall within the expected limits when a mail survey is employed. As noted earlier, the return rate for regional councils was excellent. On the other hand, that from the list drawn from the 1975 Muncipal Yearbook was less than expected. This was a major source for obtaining public works directors and as noted earlier the return rate for this group was low. One possible cause suggested for the lower rate was the instrument's emphasis on planning skill. Another possible reason may be related to the size of the agency. Subsequent analysis of the data indicated that most public works responses came from larger communities(over 50,000). Why agencies in smaller communities did not participate is not known.

Overall the pattern of returns is such that the staff has confidence in the data. We were satisfied that the instrument was well designed and think that the sample is representative of the populations we wanted to examine.

SECTION III

DATA ANALYSIS

The returned questionnaires were coded and the resultant data punched on cards. These data were analyzed using SPSS, a computer package designed to analyze data from the social sciences. SPSS has a wide capability ranging from simple descriptive statistics to very complex statistical procedures such as cononical correlations. Discussion in this segment of the report will center on descriptive statistics from the survey.

Given the extensive character of the questionaire, analysis could take many forms. The initial run through the data was used to generate frequency distributions for each question in the questionnaire. Highlights of that data follow. Initial discussion will center on the characteristics of the respondents.

Before beginning, however, a word of explanation is in order. The subsequent section contains numerous tables some of which appear to be repetitious. The rationale behind the extensive use of tables is to allow users to develop their own groupings of skill based on their interpretations of the data and in light of their own situations and needs.

The regional distribution of respondents is shown in Table 4. Nearly forty-four percent of the respondents came from the regional target areas, while just over fifty-six percent were in the national subset of the sample. Within the regional target areas, the distribution of respondents is closely related to the populations of each region. That is, the most populated target regions make up the largest share of the respondents. Among the national subset, the best returns were from the midwest. The other three sections of the country were nearly equal in response rate. The geographic distribution of respondents is such that we believe both elements in the sample, national and regional target areas, are representative of the populations from which they are drawn.

TABLE 4.

Geographic Distribution of All Respondents

Region	Absolute Frequency	Relative Frequency (PCT)	Adjusted Frequency (PCT)
Ohio-Penn.	62	20.9	21.1
Wisconsin	19	6.4	6.5
Nebraska	16	5.4	5.4
Arizona	32	10.8	10.9
Other Eastern	33	11.1	11.2
Other Midwestern	50	16.8	17.0
South	43	14.5	14.6
Far West	39	13.1	13.3

The types of agency responding are shown in Table 5 Regional planning agencies account for nearly sixty percent of the returns. This domination is by design as regional agencies frequently combine the functions of planning and capital improvement coordination for a designated area. In doing so, they generally require the skills of both planners and engineers affording the best single type of agency to survey concerning planning and public works related skills. The other catagories with substantial numbers of respondents are municipal planners, public works agencies, and consultants. Three catagories, community development agencies, multiple, and others, do not have enough respondents to allow any significant analvsis.

TABLE 5

Type of Agencies Responding to the Skills Survey

Type of Agency	Absolute Frequency	Relative Frequency (PCT)	Adjusted Frequency (PCT)	Cumulative Frequency (PCT)
Municipal Planning	48	16.2	16.2	16.2
Regional Planning	177	59.6	59.8	76.0
Public Works	32	10.8	10.8	86.6
Consultants	20	6.7	6.8	93.6
Community Development	3	1.0	1.0	94.6
Multiple	9	3.0	3.0	97.6
Other	7	2.4	2.4	100.0

The distribution of respondents by agency type is generally as expected. The only catagory where responses did not meet expectations is in the area of public works. The possible explanation of that problem and measures taken to resolve it have been previously alluded to.

The populations of the respondent's jurisdictions are shown in Table 6 The distribution is as expected. Few places or regions with populations under 2500 would be expected to have planning or public works agencies. The same appears to be true for places or regions of 25,000 or less. As population increases, so also does the complexity of government. Based on the survey results, 25,000 appears to be a critical threshold for planning and public works activities. About eighty percent of the respondents have jurisdictions of 25,000 or more people. This suggests that such jurisdictions are the best potential market for the technologist's skills. The slightly more than eight percent of the respondents in categories of "Does not apply" or "missing data" are explained by the consultants who responded. Consultants have no jurisdictions.

TABLE 6

Population of Respondents' Jurisdictions

Population of Jurisdiction	Absolute Frequency	Relative Frequency (PCT)	Adjusted Frequency (PCT)	Cumulative Frequency (PCT)
Under 2,500	4	1.3	1.4	1.4
2,501 to 25,000	38	12.8	13.2	14.6
25,001 to 100,000	81	27.3	28.2	42.9
100,001 to 500,000	109	36.7	38.0	80.8
Over 500,000	44	14.8	15.3	96.2
Does not Apply	11	3.7	3.8	100.0

The characteristics of the respondent's staffs are shown in Tables 7 to 12. Generally,the range in the size of full time staff is related to the differences in planning and public works agencies. Most planning organizations have less than twenty staff members while public works agencies with all their functions, e.g., street maintenance, garbage collection, and water treatment have a large staff.

Over ninty percent of the respondents have less than thirty professionals on their staff. Most respondents have at least one professional on their staff. The majority have between one and eight professionals while less than ten percent have more than thirty professionals. If it is assumed that one technologist was required to support four professionals, seventy percent of the respondents would require at least one technologist.

The responses to queries concerning graduate education shows that more than three fourths of the agencies have at least one person trained at the graduate level. Planners are more frequently employed by the respondent than are engineers. Over three fourths of the organizations replying employed one or more planners while just over half reported one or more engineers on their staff.

These characteristics reflect,as does the sample and the rate of return, the greater emphasis on planning in the survey. On the other hand, the public works engineering element is well enough represented that some meaningful conclusions can be drawn.

The significance of the planning orientation of respondents is evident in distribution of the time organizations devote to various planning and work functions.

TABLE 7

Size of Full Time Staff of Respondents

Size	Absolute Frequency	Relative Frequency (PCT)	Adjusted Frequency (PCT)	Cumulative Frequency (PCT)
1-5	60	20.2	21.1	21.1
6-10	65	21.9	22.8	43.9
11-20	62	20.9	21.8	65.6
21-30	35	11.8	12.3	77.9
31-60	21	7.1	7.4	85.3
61-300	30	10.1	10.5	95.8
300-1000	10	3.4	3.5	99.3
over 1000	2	0.7	0.7	100.0

TABLE 8

Number of Professionals on the Staff of Respondents

Number of Professionals	Absolute Frequency	Relative Frequency (PCT)	Adjusted Frequency (PCT)	Cumulative Frequency (PCT)
0 or no response	13	4.4	4.4	4.4
1-3	75	25.3	25.3	29.6
4-8	94	31.6	31.6	61.3
9-15	53	17.8	17.8	79.1
16-30	34	11.4	11.4	90.6
Over 30	28	9.4	9.4	100.0
TOTAL	297	100.0	100.0	

TABLE 9

Number of Persons on Respondents' Staff Holding Master's Degrees

Number Having Master's Degree	Absolute Frequency	Relative Frequency (PCT)	Adjusted Frequency (PCT)	Cumulative Frequency (PCT)
0 or no response	69	23.2	23.2	23.2
1	51	17.2	17.2	40.4
2-3	61	20.5	20.5	60.9
4-5	48	16.2	16.2	77.1
6-10	32	10.8	10.8	87.9
11 or more	36	12.1	12.1	100.0
TOTAL	297	100.0	100.0	

TABLE 10

Number of Planners on Respondents' Staff

Number of Planners	Absolute Frequency	Relative Frequency (PCT)	Adjusted Frequency (PCT)	Cumulative Frequency (PCT)
0 or no response	70	23.6	23.6	23.6
1	52	17.5	17.5	41.1
2-3	68	22.9	22.9	64.0
4-5	37	12.5	12.5	76.4
6-10	33	11.1	11.1	87.5
Over 10	37	12.5	12.5	100.0
TOTAL	297	100.0	100.0	

TABLE 11

Number of Engineers Employed by Respondents

Number of Engineers	Absolute Frequency	Relative Frequency (PCT)	Adjusted Frequency (PCT)	Cumulative Frequency (PCT)
0 or no response	139	46.8	46.8	46.8
1	65	21.9	21.9	68.7
2-3	31	10.4	10.4	79.1
4-5	14	4.7	4.7	83.8
6-10	14	4.7	4.7	88.6
Over 10	34	11.4	11.4	100.0
TOTAL	297	100.0	100.0	

TABLE 12

Respondents' Expenditure of Time on Various Types of Planning

Type of Planning	Major Portion of time (over 20% of all activities)	Moderate Portion of time	Not Significant	No Response
Community Development	37.7	37.0	17.2	8.0
Social Service	13.8	19.2	56.2	10.8
Housing Analysis	18.2	44.4	27.3	10.1
Neighborhood	12.5	29.6	48.1	9.8
Public Works	22.9	16.8	49.5	10.8
Transportation	31.3	31.6	29.3	7.7
Capital Improvements	17.2	37.7	36.0	9.1
River/Coastal	14.5	19.9	52.5	13.1
701	49.8	16.5	24.9	8.8
Zoning/Land Use	34.3	36.4	22.2	7.1
General Research	26.3	51.9	14.5	7.4

Respondents' planning functions tend to center on community development, housing, transportation, captial improvements, 701 planning, zoning and land use, and general research. Such emphasis is consistent with the functions of a planning agency. It is important to note that two types of planning involving significant engineering input also appear in the list of important in terms of time devoted. These are capital improvements and transportation. The lower priorities assigned social planning, neighborhood planning and river/ coastal suggest that these are of lesser importance to the respondents. More specifics about the work function of the respondents are shown in Table 13 ;

TABLE 13

Time Spent on Specific Work Functions By Responding Organizations

Function	Major Portion of time (over 20% of all activities)	Moderate Portion of time	Time Not Significant	No Response
Developing preliminary design concepts	23.2	26.6	41.4	8.8
Supervising contracts for planning or design	12.5	31.3	46.1	10.1
Preparation of Federal & State applications	33.0	42.1	20.2	4.7
Program development and analysis	25.3	51.5	14.8	8.4
Data process and information system development	28.3	49.5	15.5	6.7
Updating maps	24.9	41.9	19.9	7.4
Drafting	20.9	45.1	24.2	9.7
R & D for computer models	2.4	14.1	71.4	12.1
Project review	29.0	39.4	24.9	6.7
Program Evaluation	8.8	52.5	29.0	9.8
Environmental Impact Analysis	7.4	45.5	37.7	9.4
Preparing Cost Estimates	14.5	23.9	52.5	9.1
New Construction Inspection	15.2	13.1	59.3	12.5
Housing Inspection	6.7	9.8	70.0	13.5
Contract consulting	6.4	16.5	64.0	13.1

Six functions appear to be the most important to the respondents. These six are development of preliminary design concepts, preparation of state and federal applications, program development, data processing, updating maps and project reviews. Again, these tasks seem most oriented toward planning agencies, however, most have important engineering components. Computer modeling and building inspections were not important to the respondents. The lack of importance of computer modeling is indicative of non-use of this tool by planners. If building inspection organizations had been a group specifically included in the sample, the responses to questions on inspection is likely to have shown more important.

One of the most important questions posed by the survey was the potential market for the technologist. Only 14.5 percent of the respondents indicated that they would not hire any urban technologists during the next five years. Half would hire at least one per year for a five year period , while one-forth would hire more than one per year. Table 14 offers a break down on the potential hiring of technologists in the next five years. These results leave little doubt that there is a market for a technically trained individual in the area of public works and planning.

TABLE 14 Technologist Demand

Number Hired per year for next five years	Number of Respondents	Percent of Respondents
0 or no response	43	14.5
1	146	49.1
1-2	25	8.4
Over 2	83	28.0
Totals	297	100.0

A further check on the relevance of the technology program can be gained by examination of the number of nonprofessional employees employers would encourage to upgrade their skills in an urban technology program. This information is found in Table 15.

TABLE 15

Number of Nonprofessional Employees Employers Would Encourage to Upgrade Their Skills in An Urban Technology Program

Number of Employees	Number of Employers	Percent of Employers
No response or 0	63	21.2
1	41	13.8
2-3	63	21.2
4-9	33	11.1
16-25	7	2.4
Over 25	84	28.3

Clearly, the employers see the technologist program as a means for upgrading the skills of their employees. This information coupled with that on the potential market demonstrates a definite need for the development of a program designed to teach technical skills to both employees and prospective employees of planning and public works agencies. The specific skills employers require are the subject of the subsequent section of this report.

Having demonstrated a need for technically trained persons, how should they be trained? What skills are needed? The questionnaire asked respondents to rate the importance of seventy different skills to the operation of their organization.

We believe such information is critical to the formulation of a curriculum. This approach provides a means for developing a curriculum to train students for the tasks they face or will face on the job and not what some textbook or instructor thinks students should know. To produce a technologist with maximum utility it is imperative that he be able to function effectively and efficiently in the daily routine of his employing organization.

Tables 16&17 provide information on the skill needs of the responding organizations. Respondents were asked to indicate the importance of skills using a scale from one to five where a value of one was essential to the operation of their organization, a value of three indicated a desirable skill, and a value of five indicated the skill was not important. Table 16 is a ranking of all the skills in the survey based on the cumulative frequency of respondents giving a skill a value of one, two, or three on the above mentioned scale. In the format of the questionnaire, these skills rate from essential to desirable to the operation of responding agencies. Table 17 indicates the percent of respondants that rated a skill essential, a value of one on the rating scale.

The two tables are helpful in identifying the skills that should be included in a technical training program. These data were reviewed by the staff and the Educational Advisory Committee in an attempt to identify certain sets of skills that might be grouped into instructional units. These units become the basic building blocks of a curriculum to train the technician. Other more specialized elements of a curriculum were developed

TABLE 16

RANK OF SKILLS BY IMPORTANCE TO THE OPERATION OF ALL RESPONDING ORGANIZATIONS

Rank	Skill	Percent of Organizations Ranking Skill Essential to Desirable
1	Write a clear and concise report	98.2
1	Work effectively with professionals of other agencies and departments	98.2
3	Work effectively with citizen's groups	97.5
4	Find and understand information in government documents	97.2
5	Speak effectively to a professional group	96.8
5	Speak effectively to a citizen's group	96.8
7	Present a technical issue to public officials	96.6
8	Read a topographic map	94.0
9	Perform graphic design, color code maps and charts	92.3
10	Assist in an environmental impact analysis	91.8
11	Research zoning and subdivision regulations without assistance	91.1
12	Conduct a formal telephone or personal interview	90.7
13	Conduct a land use capability analysis	87.9
14	Possess a working knowledge of census data and other pertinent informational resources	87.7
15	Analyze the results of a questionnaire or opinion survey	87.1

TABLE 16 (Cont'd)

15	Work effectively with racial minorities	87.1
17	Develop a land use map	86.6
18	Organize an interagency task force	84.7
19	Assist in a cost-effectiveness analysis	83.3
20	Research without assistance a problem in planning law	82.9
21	Do line drawings	82.8
22	Prepare a population projection	82.7
23	Read a blueprint	82.1
24	Develop a land capability map	82.0
25	Analyze alternative recommendations for changes in state and local laws	81.6
26	Interpret air photos of land use	81.3
27	Collect data for an economic base study	81.1
28	Understand alighment, profiles and cross sections	79.6
29	Draw a representative sample of a known population	77.8
30	Use a programmable desk calculator	77.4
31	Do basic cost accounting	77.3
32	Interpret a building code	77.1
33	Conduct a critical path analysis of a scheduling problem	76.7
34	Use a typewriter	72.8
35	Scribe a map	72.7
35	Make use of a simulation model for transportation or land use planning	72.7
37	Analyze traffic count data	72.1
38	Calculate measures of central tendency	71.7
39	Assist in a right-of-way analysis	70.8

TABLE 16 (Cont'd)

39	Perform algebraic or trigonometric computations	70.8
41	Interpret a cross tabulation of two variables	70.6
42	Do a network analysis of a transportation problem	68.8
43	Understand survey notes and terminology	66.9
44	Prepare a cost estimate analysis for a public works project	64.8
45	Calculate a correlation coefficient	64.5
46	Conduct an on-site zoning inspection	60.9
47	Calculate a linear regression	60.6
48	Take a traffic count	59.2
49	Tabulate and analyze project bid proposals	58.6
50	Interpret a linear regression equation	57.7
51	Lay out a sewer plan	57.3
52	Interpret partial and multiple correlation coefficients	55.4
52	Use a geocoding system	55.4
54	Interpret the results of a factor analysis	55.3
55	Calculate sewer flows	51.4
56	Do general computer programming	50.9
56	Be familiar with the properties of various construction materials	50.9
58	Measure hydrologic flows	49.8
59	Do plane table mapping	47.4
60	Interpret remote images	44.9
61	Perform an elementary time and motion study	41.6
62	Use surveying instruments to lay out a site	39.9

63	Take a soil sample	37.9
64	Interpret correlation coefficients and statistical significance	34.9
65	Take and analyze a water sample	34.6
66	Build a three-dimensional structural model	33.1
67	Analyze a soil sample	32.7
68	Conduct a fire safety inspection of a house or building	28.6
69	Use computer statistical packages	28.5
70	Use computer graphic software packages	23.0

TABLE 17

SKILLS MOST FREQUENTLY IDENTIFIED AS ESSENTIAL BY RESPONDENTS

Rank	Skill	Percent of Respondents Identifying as Essential
1	Write a clear and concise report	83.8
2	Work effectively with professionals in other agencies and departments	75.4
3	Present a technical issue to a public official	73.0
4	Speak effectively to a citizen's group	72.3
5	Work effectively with a citizen's group	70.8
6	Speak effectively to a professional group	62.7
7	Find and understand information in government documents	60.9
8	Develop a land use map	58.1
9	Possess a working knowledge of census data and other pertinent informational resources	57.1
10	Read a topographic map	56.5
11	Research zoning and subdivision regulations without assistance	55.0
12	Perform graphic design, color coding of maps and charts	51.7
13	Work effectively with racial minorities	48.9
14	Read a blueprint	46.7
15	Conduct a formal phone or personal interview	46.3
16	Develop a land capability map	45.2
17	Do line drawings	44.6
18	Assist in an environmental impact assessment	42.7

by analyzing the responses of various types of organizations within the sample and variable called need. These are discussed in a later segment of the report.

Eighteen skills essential to the training of the technologist were identified using the following criteria: To qualify a skill must have been rated essential (a value of one) by forty percent of the respondents and eighty percent had to have ranked it in the essential to desirable range (values ranging between one and three). Application of these criteria serves to identify those skills that respondents perceive as being of the greatest importance to the operation of their organizations. The skills meeting these requirements are shown in Table 18.

TABLE 18

Primary Skills

Write a clear and concise report
Work effectively with professionals in other agencies and departments
Present a technical issue to public officials
Speak effectively to a citizen's group
Work effectively with a citizen's group
Speak effectively to a professional group
Find and understand information in government documents
Develop a land use map
Possess a working knowledge of census data and other pertinent informational resources
Read a topographic map
Research zoning and subdivision regulations without assistance
Perform graphic design, color coding of maps and charts
Work effectively with racial minorities
Read a blueprint
Conduct a formal phone or personal interview
Develop a land capability map
Do line drawings
Assist in an environmental impact assessment

After considerable study, these skills were grouped into tentative instructional units. These units and the skills encompassed by each, are listed in Table 19.

TABLE 19

PRIMARY INSTRUCTIONAL UNITS

Unit	Skills Encompassed by the Unit
Communications	Write a clear and concise report
	Work effectively with professionals in other agencies and departments
	Present a technical issue to public officials
	Speak effectively to a citizen's group
	Work effectively with a citizen's group
	Work effectively with racial minorities
	Conduct a formal phone or personal interview
	Speak effectively to a professional group
Mapping and Graphics	Develop a land use map
	Read a topographic map
	Perform graphic design color coding of maps and charts
	Read a blueprint
	Develop a land capability map
	Do line drawings
Data Collection	Find and understand information in government documents
	Possess a working knowledge of the census and other pertinent data sources
	Research zoning and subdivision regulations without assistance
	Develop a land use map
	Develop a land capability map
Other	Assist in an environmental impact analysis

Based on the survey results and our contacts with practioneers, we think training in these skills should become the focal point in the education of the urban technologist. These skills represent the minimum requirements in a curriculum to train technologists.

A further discussion of these skills groups is found in the segment of this report devoted to instructional module development. It is, however, important to point out that we think these skills are the basic tools that the technician needs to effectively support the work of planning and public works organizations.

Realizing that the technician is more apt to be a specialist than a generalist, we thought it important to analyze various subgroups in the sample to identify skills that were unique to various types of employers. The same criteria were applied to the data, that is, forty percent identifying a skill as essential and eighty ranking it in the essential to desirable range. Five subgroups were analyzed. These groups were regional planners, municipal planners, public works agencies, and others. Table 20 identifies the skills meeting the above criteria for each of the five different types of employers.

TABLE 20

PRIMARY SKILLS BY TYPE OF ORGANIZATION

Regional Planners

Conduct a land use capability analysis
Analyze the results of a questionnaire or opinion survey
Prepare a population projection
Collect data for an economic base study
Organize an interagency task force

TABLE 20 Cont'd.

Municipal Planners

Organize an interagency task force
Conduct an on-site zoning inspection
Understand alignments and profiles
Tabulate and analyze a project bid

Public Works Agencies

Prepare a cost estimate for a public works project
Tabulate and analyze project bid proposals
Understand survey notes and terminology
Perform algebraic or trigometric calculations
Use a survey instrument to lay out a site
Understand alighments, profiles and cross sections
Calculate sewer flows
Be familiar with various construction materials
Lay out a sewer plan
Measure a hydrologic flow
Interpret a building code

Consultants

Lay out a sewer plan
Understand alignment and profiles
Calculate sewer flows
Understand survey notes and terminology
Use survey instruments to lay out a site
Prepare a cost-estimate for a public works project
Tabulate and analyze project bid proposals
Perform algebraic and trigonometric computations
Measure hydrological flows
Assist in a right-of-way analysis

Others

Understand survey notes and terminology
Perform algebraic and trigonometric computations
Collect data for an economic base study
Understand alignments, profiles and cross sections
Tabulate analyze project bids proposals
Draw a representative sample from a known population
Assist in a cost-effectiveness analysis

These data were also analyzed by the staff and Educational Advisory Committee. These additional skills were arranged in groups that could constitute instructional units. These units and their associated skills are shown in Table 21.

TABLE 21

Skill Groupings

Advanced Data Collection and Analysis
- Conduct a land use capability analysis
- Collect data for an economic base study
- Analyze the results of a questionnaire or public opinion survey
- Prepare a population projection
- Draw a representative sample from a known population

Code and Regulation Enforcement
- Conduct an on-site zoning inspection
- Interpret a building code

Accounting
- Tabulate and analyze project bid proposals
- Prepare a cost estimate for a public works project
- Assist in a cost effective analysis

Surveying and Measuration
- Understand alignment, profiles and cross sections
- Understand survey notes and terminology
- Use survey instruments to lay out a site
- Calculate sewer flows
- Lay out a sewer plan
- Measure hydrologic flows
- Assist in a right-of-way analysis
- Perform algebraic and trigonometric computations

Other
- Organize an interagency task force
- Be familiar with the properties of various construction materials

This process served to identify those skills that are currently required in the day to day operations of the respondent. However, it is important to develop an educational program that meets future needs. Respondents were also querried as to their current capabilities for each of the seventy skills. This question was designed to elicit information concerning skills that were in short supply. When coupled with the question concerning desirability, it becomes possible to compute an index of need. A respondent's need index was developed to identify those skills that respondents considered important and that were in short supply in their agency. The formula used to devise the index is:

$$I = R - 5(C)$$

Where:

I = the need index value

R = the median value of the importance of a skill on a scale of one to five, where one is essential and five is not important

C = the median value of respondents' current capability measured on a scale of one to three where one equals adequate and three equals none.

The need index has a maximum possible value of 12 and a minimum of 0. Index values were computed for all seventy skills for all respondents. These values are shown in Table 22

TABLE 22

Needs Index

1	Conduct a land use capability study	4.48
2	Possess a working knowledge of census data and other pertinent informational resources	4.32
2	Research zoning and subdivision regulations without assistance	4.32
4	Develop a land capability map	4.29

4	Write a clear and concise report	4.29
6	Perform graphic design, color coding of maps and charts	4.20
6	Work effectively with racial minorities	4.20
6	Assist in an environmental impact statement	4.20
9	Present a technical issue to public officials	4.18
9	Speak effectively to a citizens' group	4.18
9	Work effectively with a citizens' group	4.18
9	Make use of a simulation model for transportation and land use planning	4.18
13	Assist in a cost-effectiveness analysis	4.08
14	Read a topographic map	4.07
14	Develop a land use map	4.07
14	Speak effectively to a professional group	4.07
14	Find and understand information in government documents	4.07
18	Collect data for an economic base study	4.06
18	Prepare a population projection	4.06
20	Analyze alternative recommendations for changes in state and local laws	3.92
21	Conduct a critical path analysis of a scheduling problem	3.91
22	Analyze the results of a questionnaire or opinion survey	3.84
23	Work effectively with professionals from other departments and agencies	3.80
24	Draw a representative sample from a known population	3.78
25	Research without assistance a problem in planning law	3.78
25	Do a network analysis of a transportation problem	3.78
27	Analyze traffic count data	3.75
28	Read a blueprint	3.63
28	Conduct a formal telephone or personal interview	3.63
30	Interpret a building code	3.60
30	Do general programming	3.60
30	Organize an interagency task force	3.60
33	Assist in a right-of-way analysis	3.57
34	Do line drawings	3.52
35	Prepare a cost estimate of a public works project	3.52
35	Use computer statistical package	3.52
37	Conduct an on-site zoning inspection	3.45
37	Calculate measures of central tendency and statistical distributions	3.45
37	Do basic cost accounting	3.45
40	Lay out a sewer plan	3.42
41	Use a geocoding system	3.40
41	Interpret correlatin coefficients and statistical significance	3.40
43	Understand alignment, profiles, and cross sections	3.38
44	Scribe a map	3.36

44	Understand survey notes and terminology	3.36
46	Use a computer graphics software package	3.30
47	Use a programmable desk calculator	3.25
47	Interpret airphotos of land use	3.25
49	Calculate a linear regression	3.23
49	Interpret a linear regression equation	3.23
49	Interpret partial and multiple correlation coefficients	3.23
52	Calculate a correlation coefficient	3.20
53	Be familiar with the properties of various construction materials	3.15
54	Perform algebraic and trigonometric computations	3.12
55	Interpret a cross tabulation of two variables	3.08
56	Interpret the results of a factor analysis	3.06
57	Measure hydrologic flows	3.00
58	Use a typewriter	2.97
59	Calculate sewer flows	2.88
60	Interpret remote images	2.86
61	Take a traffic count	2.85
61	Tabulate and analyze project bid proposals	2.85
63	Perform an elementary time and motion study	2.64
64	Do plane table mapping	2.52
65	Take a soil sample	2.40
66	Use survey instruments to lay out a site	1.90
67	Analyze a soil sample	1.82
68	Take and analyze a water sample	1.82
69	Build a three dimensional structural model	1.61
70	Conduct a fire safety inspection of a house or building	1.25

In general, the index further strengthens the results obtained by examining the importance of skills. Only four of the eighteen skills identified as being primary in the training of the technologist did not appear in the top eighteen skills as defined by the need index. Two of the four, reading a blueprint and doing line drawings, are very elementary graphic skills. Another, data collection via interviewing,is also a very basic element of data collection. These results suggest that the technologist probably needs more than the rudimentary skills in both graphic and data collection.

These data also suggest that computation of index values for each of the types of employers in the sample might provide some insight regarding the training of a specialized technologist. Tables 23-27 indicate those skills having index values greater than 4.0

TABLE 23

Regional Planners' Need Index

Rank	Skill	Index Value
1	Develop a land capability map	4.4
1	Write a clear and concise report	4.4
3	Conduct a land capability analysis	4.3
3	Speak effectively to a citizens' group	4.3
3	Present a technical issue to elected officials	4.3
3	Prepare a population projection	4.3
3	Make use of a simulation model for transportation or land use	4.3
8	Develop a land use map	4.2
8	Speak effectively to a professional group	4.2
8	Find and understand information in government documents	4.2
8	Assist in an environmental impact analysis	4.2
12	Research zoning and subdivision regulations without assistance	4.1
12	Work effectively with racial minorities	4.1
12	Do a network analysis of a transportation problem	4.1
15	Read a topographic map	4.0
15	Use a computer software package	4.0
15	Collect data for an economic base study	4.0
15	Analyze the results of a questionnaire or opinion survey	4.0
15	Possess a working knowledge of census data and other pertinent informational resources	4.0
15	Conduct a formal telephone or personal interview	4.0
15	Conduct a critical path analysis of a scheduling problem	4.0
15	Assist in a cost-effectiveness analysis	4.0

TABLE 24

Rank of Needs for City Planners

1	Develop a land use map	4.7
1	Perform graphic design, color coding of maps and charts	4.7
1	Analyze alternative recommendations for changes in local or state laws	4.7
4	Write a clear and concise report	4.6
5	Research zoning and subdivision regulations without assistance	4.4
5	Possess a working knowledge of census data and other pertinent information resources	4.4
7	Read a blueprint	4.3
7	Speak effectively to a professional group	4.3
7	Work effectively with a citizens' group	4.3
7	Conduct a land use capability analysis	4.3
11	Collect data for an economic base study	4.1
11	Speak effectively to a citizens' group	4.1
11	Present a technical issue to elected officials	4.1
11	Work effectively with professionals of other agencies	4.1
15	Read a topographic map	4.0
15	Prepare a population projection	4.0
15	Assist in a cost-effective analysis	4.0
15	Assist in an environmental impact analysis	4.0
15	Assist in a right-of-way analysis	4.0

TABLE 25

Rank of Needs for Public Works Agencies

1	Write a clear and concise report	5.2
2	Be familiar with the properties of various construction materials	4.8
2	Interpret a building code	4.8
4	Assist in an environmental impact analysis	4.7
5	Measure hydrologic flows	4.6
5	Speak effectively to a citizens' group	4.6
7	Speak effectively to a professional group	4.5
7	Find and understand information in government documents	4.5
9	Do line drawings	4.4
10	Read a blueprint	4.3
10	Analyze a soil sample	4.3
10	Prepare a cost estimate for a public works project	4.3
10	Do basic cost accounting	4.3
10	Present a technical issue to public officials	4.3
15	Read a topographic map	4.2

15	Understand survey notes and terminology	4.2
15	Analyze traffic count data	4.2
15	Use surveying instruments to lay out a site	4.2
15	Calculate sewer flows	4.2
15	Work effectively with a citizens' group	4.2
20	Lay out a sewer plan	4.1
20	Work effectively with professionals from other agencies and departments	4.1
20	Assist in a cost effectiveness analysis	4.1
23	Perform graphic design color coding of maps and charts	4.0
23	Take a soil sample	4.0
23	Analyze the results of a questionnaire or opinion survey	4.0
23	Analyze alternative recommendations for changes in state and local laws	4.0
23	Conduct a critical path analysis of a scheduling problem	4.0

TABLE 26

Rank of Needs for Consultants

1	Work effectively with racial minorities	5.6
2	Present a technical issue to elected officials	4.4
3	Do line drawings	4.3
4	Calculate sewer flows	4.2
4	Measure hydrologic flows	4.2
4	Write a clear and concise report	4.2
4	Assist in a right-of-way analysis	4.2
7	Understand survey notes and terminology	4.1
7	Use survey instruments to lay out a site	4.1
7	Perform graphic design color coding of maps and charts	4.1
7	Prepare a cost estimate of a public works project	4.1
7	Perform algebraic and trigonometric computations	4.1
7	Conduct a land use capability analysis	4.1
13	Read a blueprint	4.0
13	Speak effectively to a citizens' group	4.0
13	Assist in an environmental impact analysis	4.0

TABLE 27

Rank of Needs for Others

1	Collect data for an economic base study	5.3
2	Perform algebraic and trigonometric computations	4.8
3	Do line drawings	4.7
3	Do general programming	4.7
5	Speak effectively to a professional group	4.6
5	Assist in a right-of-way analysis	4.6
7	Understand survey notes and terminology	4.4
7	Draw a representative sample from a known population	4.4
9	Interpret a building code	4.3
9	Research without assistance a problem in planning law	4.3
9	Find information in government documents	4.3
9	Work effectively with professionals of other agencies and departments	4.3
9	Prepare a population projection	4.3
13	Understand alignments, profiles, and cross sections	4.2
13	Use computer statistical packages	4.2
13	Conduct a critical path analysis of a scheduling problem	4.2
13	Use computer graphics software packages	4.2
13	Write a clear and concise report	4.2
13	Work effectively with citizens' groups	4.2
19	Speak effectively to a citizens' group	4.1
20	Read a blueprint	4.0
21	Research zoning and subdivision regulations without assistance	4.0
21	Organize an interagency task force	4.0
21	Conduct a land use capability analysis	4.0
21	Make use of a simulation model for transportation or land use planning	4.0

Again these data were reviewed by members of the staff and the Educational Advisory Committee for the purpose of grouping the skill into instructional units. These then would form the basis for building a curriculum to train the technologist. It is our belief that by tailoring a program to the every day work requirements and the perceived needs of employers that the technologist will be a person in great demand and an asset to society. In the following section, skills have been grouped into modules that are designed to be a basic framework for training the technologist.

SECTION IV

CURRICULUM DEVELOPMENT

Task four of the project was to develop trial instructional units and tentative curricula. These were to be based on the results gained in testing existing instructional materials and analysis of the data collected from the survey. The Educational Advisory Committee was to play an important role in the development of instructional units and curricula. The latter part of the task included the development of outlines and the contents of instructional units.

Most of the data contained in the previous section were presented to the project's Educational Advisory Committee. They, along with the staff, then identified eleven specific areas that comprise the core of the technologist's curriculum. These are listed in Table 28. At the outset it was apparent that no student could include all of these areas in an educational program. However, four are of such importance that the committee and staff agreed that they should be included in any technology program. The four are Documentary Data Sources, Mapping and Graphics, and both Formal and Informal Communications. The remaining seven are optional depending upon the student's interest and career aspirations.

Additional commentary on the possible curriculum arising from various combinations of the learning units can be found in the latter part of this section of the report.

TABLE 28

Basic Instructional Units in the Technologist Program

Mapping and Graphics
Documentary Data Sources
Informal Communications
Formal Communications
Primary Data Generation and
  Interpretation - Planners
Macro Controls
Micro Controls
Primary Data Generation and
  Interpretation - Public Works
Building Codes
Construction Materials .
Quantitative Methods

Having identified the subject matter of each unit, attention was turned to developing objectives and applications for each area. The intent was to formalize an objective for each unit and then identify how that objective was to be applied to the problems the technologist would be asked to cope with. The following section identifies the objective applications and skills that are included in each instructional unit.

MAPPING AND GRAPHICS

Objective: The technologist should acquire competency in the use of drawing instruments, techniques and mediums.

Applications: The technologist should be able to produce the line drawing, charts, graphs and map that are commonly employed by planning and public works agencies. Specifically, he should be able to produce isoline, choropleth, and thematic maps. Although not required as a basic part in this element of the program, the ability to use computer mapping packages and techniques would be very desirable.

Skills: Do line drawings
Scribe a Map
Read a topographic map
Develop a land capability map
Read a blueprint
Perform graphic design, color coding of maps and charts

DOCUMENTARY DATA SOURCES

Objective: The technologist should be able to locate, retrieve and interpret information from published data sources.

Applications: The technologist should become familiar with the basic library tools used by planning and public works agencies. Particular emphasis should be placed on use of census data, the publications of federal departments and agencies, state departments and agencies, as well as, local sources. The basic reference tools of planning public works related fields should be explored along with the various sources of maps and data on the physical environment. Non-governmental data sources should also be examined.

Skills: Possess a working knowledge of census data and other pertinent informational resources
Find and understand information in government documents

COMMUNICATIONS - INFORMAL

Objective: To enable the technologist to communicate and empathize with nonprofessionals.

Applications: The technologist will learn how to conduct formal and informal meetings or hearings, working with citizens' groups and presenting issues to public officials. It is expected that the technologists training will involve actual or simulated conduct of a meeting, participation in citizens' groups and communication with local public officials.

Skills: Speak effectively to a citizens' group
Work effectively with citizens' groups
Work effectively with racial minorities

COMMUNICATIONS - FORMAL

Objective: To enable the technologist to communicate with professionals in both the oral and written modes.

Applications: Technologists should learn the style used by planning and public works agencies. It is expected that part of the technologist's training will involve actual or simulating the presentation of professional communications.

Skills: Write a clear and concise report
Speak effectively to a professional group
Present a technical issue to elected officials
Organize an interagency task force
Work effectively with professionals of other agencies and departments

PRIMARY DATA GENERATION AND INTERPRETATION - PLANNING

Objective: To develop competencies in the collection and interpretation of non-published data commonly employed by planning agencies.

Applications: The technologist should be able to collect and interpret data for the following types of studies: land use, land capability, traffic flows and origins and destinations. In addition, they should be able to apply the techniques of sampling and interviewing to urban related problems.

Skills:
Collect data for an economic base study
Draw a representative sample from a known population
Conduct a formal telephone or personal interview
Conduct a land use capability analysis

MACRO CONTROLS

Objective: The technologist should develop an understanding of the legal processes at the federal and state levels as it applies to planning and public works agencies.

Applications: The technologist should become familiar with the important federal legislation pertaining to the funding and regulation of planning and public works agencies. They will be appraised of the importance of the Federal Register, as well as, the basic elements of state enabling legislation relating to planning and public works.

Skills:
Analyze alternative recommendations for changes in local or state law
Find and understand information in government documents
Research without assistance a problem in planning law

MICRO CONTROLS

Objective: The technologist should develop an understanding of the legal processes and applications of zoning ordinances, subdivision regulations and housing codes.

__Applications__: The technologist should review the tenor of court decisions regarding zoning subdivision, regulations and housing codes. They should become familiar with model ordinances and regulations and the procedures involved in changing or altering same.

__Skills__: Research zoning and subdivision regulations without assistance
Conduct an on-site zoning inspection
Analyze alternative recommendations for changes in local or state laws
Research without assistance a problem in planning law

PRIMARY DATA COLLECTION AND INTERPRETATION - PUBLIC WORKS

__Objective__: To develop competencies in the collection and interpretation of nonpublished data commonly employed by public works agencies.

__Applications__: The technologist will learn to collect and interpret such data as traffic flows, surface runoffs, sewer flows and conduit requirements. They will also learn the techniques of land measuring and interpretation of survey notes for alignments, profiles and cross-sections.

__Skills__: Understand survey notes and terminology
Use survey instruments to lay out a site
Calculate sewer flows
Measure hydrologic flows
Lay out a sewer plan
Understand alignments, profiles and cross-sections

BUILDING CODES

__Objective__: The technologist should develop an understanding of the basic codes utilized by communities to promote the safety and habitability of structures.

Applications: Technologists should be introduced to national, state and local building codes. They should be able to use stress analysis, pipe flow and electrical formulas to check structures for compliance.

Skills: Interpret a building code

CONSTRUCTION MATERIALS

Objective: The technologist should develop a knowledge of the properties, capabilities and uses of various construction materials.

Applications: Emphasis will be placed on the capabilities of building materials to function in various uses in highways, dams and reservoirs, buildings, etc. Basic material properties will be introduced so that information may be applied to building code and housing inspections.

Skills: Be familiar with the properties of various construction materials

QUANTITATIVE METHODS

Objective: The technologist should develop a competency in the basic statistical techniques utilized in planning and public works agencies.

Applications: Technologists will apply descriptive statistics to data used in planning and public works agencies.

Skills: Perform algebraic and trigonometric computations
Calculate measures of central tendencies
Draw a representative sample of a known population
Analyze the results of a questionnaire or opinion survey

Having identified the objectives, applications and skills the technologist would require,attention was directed to the development of an outline for each module. Authors for the modules were sought from persons who were already acquainted with the technologist concept. In some cases, it was possible to find the required expertise within our staff or advisors, in others we sought to find persons that had both academic and practical experience in fields relevant to the objectives of the module. Again the advisors and consultants to the project were most helpful in identifying potential authors. Having secured a group of potential authors, a guide for writing the modules was prepared by the staff. This document if found in Appendix D.

Each writer was asked to supply a statement of objectives, an instructional outline, a student reading list, suggested instructional strategies, and a means for evaluation. In addition, each writer was apprised of several constraints.

First, the module should be a self-contained learning sequence for two or four year undergraduates. Authors should assume that a student has no experience or background in the subject matter of the module. Secondly, the basic goal of the technologist development program is to produce "doers." The technologist needs a specific set of skills and capabilities as opposed to a strong conceptual grounding. Conceptual acquisition should be an important element of the module, but it should not be the paramount objective. Finally, the module should be a "cookbook" for the instructor. Most instructors in a technology program will have neither your experience nor expertise. Out of necessity, instructors will have to rely on the materials the author supplies to provide a step by step "how to do it" approach.

The subsequent part of this report are the modules developed for the basic elements in the technology program.

Readers should be cautioned concerning the modules. First, they are only tentative outlines. They have not been tested in classroom situations although several will be tested during the 1976-77 school year at Youngstown State University. Secondly, the staff thought it important to allow the authors considerable independence in developing a module. Accordingly, modules vary somewhat in their comprehensiveness and documentation. However, in all cases the reader is given an adequate guide from which to develop a course of instruction. Finally, it should be noted that the modules were prepared for use by persons with little or no expertise. They are by design very elementary.

SECTION V

INSTRUCTIONAL MODULES

This section contains representative instructional module outlines completed at this time. Others not shown are also complete while new ones are being developed. Copies of specific modules may be obtained by writing the Program Director.

Instructional Module Contributors

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AN INSTRUCTIONAL MODULE
FOR DOCUMENTARY DATA SOURCES

Roselyn Stephens

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

To be able to locate, retrieve and interpret information from published data sources.

INSTRUCTIONAL OUTLINE

I. Location of Library Materials
  A. Function of the card catalog
  B. Types of catalog cards
    1. author
    2. title
    3. subject
  C. Explanation of the call number
  D. Classification systems
    1. Dewey Decimal
    2. Library of Congress
    3. special
  E. Library guides

Good coverage of these topics can be found in:

> Durrenberger, Robert W., Geographical Research and Writing, (New York: Crowell, 1971), pp. 42-50.

In the same way that a dictionary helps one find specific words out of the entire language, a library's card catalog helps one locate the material needed out of an entire library collection. The card catalog is the index for materials in a library system, each piece of material being represented on at least one card or entry.

Library materials are generally represented in the card catalog by an author card, title card, and subject card. The author, designated as the main entry, may be a person, a government agency, an association, and institution, or -- in rare instances -- the title.

Once an entry has been located in the card catalog the call number which is printed in the upper left corner of the catalog card is needed in order to locate the book on the library shelf. The call number uniquely identifies a particular item -- no two books have exactly the same call number.

Books and other materials have call numbers assigned according to a particular classification system. The two classification systems most often used today are:

(1) The Dewey Decimal Classification System which divides knowledge into ten major subject areas or classes, with a number assigned to each class.

(2) The Library of Congress Classification System which consists of one or two letters followed by a number. The first letter indicating the general subject area of the publication with a second letter frequently used to indicate a major subdivision of information.

A specialized subject library may develop and use a classification system unique to its own collection. Even a library using the Dewey Decimal or the Library of Congress Classification System may choose to adapt it to meet the needs of that particular library's collection.

Most libraries have available printed instructional guides that will explain the type of classification system adopted, as well as, a general floor plan, scheduled hours, and types of services offered. As each library is unique and in order to receive the best library service, it is recommended that an instructor familiarize himself with the library to be used by students.

II. Bibliographic Guides to Reference Materials
   - A. Introduction
      1. purpose
      2. uses
   - B. General Reference Materials
   - C. Specialized Reference Materials

Best Bibliographic Guides available:

> Walford, Arthur John, Guide to Reference Materials, (Third Edition; London: Library Association, 1973).
>
> Winchell, Constance M., Guide to Reference Books, (Eighth Edition; Chicago: American Library Association, 1967, and supplements 1950 to date).

Good discussion of bibliographic guides available in:

> Katz, William, Introduction to Reference Work, Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 32-36.

Guides to reference materials are valuable in obtaining an overall view of the types of resources available. A bibliographic guide will introduce the user to the general sources, as well as, the specialized materials that are available. A guide may be general or selective.

Two basic guides to reference materials that give general coverage in all major fields are Winchell's Guide to Reference Books and Walford's Guide to Reference Materials. Both have complete bibliographic information for each entry. They are selective in their coverage, attempting to list the best sources available.

III. Standard Bibliographic Aids -- Encyclopedias
   - A. Introduction
      1. definition
      2. purpose
      3. uses
   - B. Types
      1. general
      2. subject

For discussion on Encyclopedias see:

Katz, William, Introduction to Reference Work, Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 89-148.

Winchell, Constance, Guide to Reference Books (Eighth Edition; Chicago: American Library Association, 1967), pp. 81.

Encyclopedias can provide a quick, reliable, uncomplicated discussion of a subject. The beginning point for study of a topic can often best be found in an encyclopedia. This source provides factual background information and often includes bibliographies which can lead to continued study of a topic.

There are two basic types of encyclopedias. The first is the general work which contains information on a multitude of topics, e.g., The Americana. The second, the subject encyclopedia, attempts to discuss in depth all aspects on a particular topic, e.g., McGraw Hill Encyclopedia of Science and Technology.

IV. Standard Bibliographic Aids -- Periodical and Newspaper Indexes
  A. Periodical Indexes
    1. definition
    2. purpose
    3. types
      a. general
      b. subject
  B. Newspaper Indexes

For discussion of periodical and newspaper indexes see:

Katz, William, Introduction to Reference Work: Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 61-70.

Winchell, Constance, Guide to Reference Books, (Eighth Edition; Chicago: American Library Association, 1967), pp. 132-150.

Articles from newspapers and periodicals can be an important source of information for planners. They can provide the latest information on a topic and often the only information available.

The H.W. Wilson Company is responsible for publishing the vast majority of periodical indexes today. The most widely used index, Readers' Guide to Periodical Literature, lends itself to ease of use covering some 160 magazines of general interest.

Subject indexes can be extremely useful since they attempt to cover the material published in a specialized field, e.g., Business Periodicals Index. Here will be found material indexed from the periodicals that specialize in the business field.

Public Affairs Information Service Bulletin is a major source of information for material in the subject area of social sciences.

Most large newspapers also publish their own indexes, e.g., The New York Times Index and the Wall Street Journal Index. These can be most helpful in locating information on current events. Both offer wide coverage that can be helpful in locating timely material. These are particularly useful in keeping abreast with current material issued by HUD and the U.S. Department of Transportation.

V. Standard Bibliographic Aids -- Dictionaries
   A. Introduction
      1. definition
      2. information contained
   B. Types
      1. general
      2. specialized
   C. Examples of dictionaries

For discussion on dictionaries see:

Katz, William, Introduction to Reference Work: Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 249-285.

Winchell, Constance, Guide to Reference Books, (Eighth Edition; Chicago: American Library Association, 1967), pp. 91.

A dictionary is the main source for information concerning words, their spelling, pronunciation and meaning. The large modern dictionaries also include other information, e.g., illustrations, charts, tables. In addition to the general language dictionaries, there are specialized dictionaries covering such areas as subject fields, acronyms, slang, and synonyms. Webster's Third New International Dictionary is one of the best general dictionaries available, while Webster's Geographical Dictionary gives excellent subject coverage to the geographical field. Planners should become familiar with the special features contained in dictionaries as often they can provide timely information.

VI. Standard Bibliographic Aids -- Directories
   A. Introduction
      1. information contained
      2. uses
   B. Types
   C. Examples of directories

For discussion of directories see:

Katz, William, Introduction to Reference Work: Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 193-197.

Winchell, Constance, Guide to Reference Books, (Eighth Edition; Chicago: American Library Association, 1967), pp. 67.

Due to the large number of organizations, agencies, and businesses today, directories have become extremely useful sources of information. They provide facts about operational activities of organizations and the members and officials of organizations. Directories may contain biographical information often difficult to obtain elsewhere.

Information on industrial concerns can be found in Thomas Register to American Manufacturers and Poor's Register of Corporations, Directors, and Executives.

Directories may be categorized by the following types: local, governmental, institutional, professional, and trade and business. Planners will find both city and telephone directories to be useful tools.

VII. Standard Bibliographic Aids -- Atlases
    A. Introduction
        1. definition
        2. information contained
    B. Types
        1. world
        2. national
        3. state
    C. Examples of atlases

For discussion on Atlases see:

Katz, William, Introduction to Reference Work: Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 287-310.

PAGE 10 OF THE MODULE "AN INSTRUCTIONAL MODULE FOR DOCUMENTARY DATA SOURCES" MISSING FROM DOCUMENT PRIOR TO ITS BEING SHIPPED TO EDRS FOR FILMING

Good discussion of guides to government documents in:

> Katz, William, Introduction to Reference Work: Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 328-336.

A wealth of information can be found within the publications issued by the national, state and municipal government agencies. Due to the numerous publications being issued, guides are extremely valuable in locating a particular document. On the federal level the Monthly Catalog of United States Government Publications is the most comprehensive bibliographic guide available for locating a federal document. It offers the user a subject approach which can be extremely helpful. The arrangement of the Monthly Catalog is alphabetical by issuing agencies. This lends itself to a quick check by planners for material issued by the following agencies: Department of Housing and Urban Development, Department of Transportation, Department of Labor, Department of Commerce, Department of Health, Education and Welfare, Department of Agriculture, and the Department of the Interior.

For location of documents at the state level the Monthly Checklist of State Publication is available. It includes the state publications received by the Library of Congress and is issued monthly by the Library.

Unfortunately, indexes covering local documents are very uncommon. The best approach is usually to consult local libraries. A less successful method may be to go to planning agencies themselves. In some parts of the country, some attempts have been made to develop information systems to assist planners. These systems, like indexes for local materials, are very rare.

Several other books are available to assist planners in wading through the mass of material published by federal and state governments. Among the best of these are: John Andriot's Guide to U.S. Government Serials and Periodicals; Joseph Lu's U.S. Government Publications Relating to the Social Sciences; and Sally Winkoop's Subject Guide to Government Reference Books.

IX. Map Sources
    A. International
    B. Federal
    C. Topographic Maps
    D. Local Map Sources
        1. engineering maps
        2. tax maps
        3. planning maps
        4. others

Good discussion of map sources in:

Chapin, F. Stuart, Jr., Urban Land Use Planning (Second Edition; Urbana: University of Illinois Press, 1965), pp. 257-264.

Katz, William, Introduction to Reference Work: Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 301-303.

Wrigley, Robert L., Jr., "The Sanborn Map as a Source of Land Use Information for City Planning," Land Economics, Volume 24, Number 2, (May, 1949).

Maps are available from different sources usually depending upon what type of information is desired. Many of the United States government bureaus publish maps which are

They show street rights-of-ways, water features, corporate limits and other engineering information. Common scales are 50 or 100 feet to the inch. Tax maps are usually maintained by the county assessor. These maps usually show street rights-of-ways, property lines, easements, water features and political boundaries. Scales range from 50 to 600 feet to the inch. These maps are of considerable importance to planners for land use surveys, subdivision review and zoning administration.

Planning agencies prepare numerous maps as a part of their program. The best known of these, the land use map, portrays variations in land use via a color coding system. Another important map, usually prepared by the planning agency is the zoning map. This map is part of the zoning ordinance and identifies zones of permitted land use within the city. The agency also may produce maps showing the distribution of various physical, social and economic characteristics of a community.

X. Census Material
    A. Types of Censuses
    B. Guides to Census Publications
    C. Data Collection Units
    D. Urban Atlases
    E. Other Bureau Publications

For discussion of Census Material see:

Dent, Borden D.(ed), Census Data: Geographic Significance and Classroom Utility, (Tualatin, Oregon: Geographic and Area Study Publications, 1976).

The Census is probably one of the planner's most frequently used tools. It is of great importance that planners have a basic understanding of the extend and limitations of the Census. Most persons are unaware of the extensive nature of the Census Bureau's publication program. By law the Census Bureau takes the following censuses.

Census	Periodicity	Recent Censuses	Next Census
Population	10 years	1960, 1970	1980
Housing	10 years	1960, 1970	1980
Agriculture	5 years	1969, 1974	1979
Business	5 years	1967, 1972	1977
Construction Industries	5 years	1967, 1972	1977
Governments	5 years	1967, 1972	1977
Manufactures	5 years	1967, 1972	1977
Mineral Industries	5 years	1967, 1972	1977
Transportation	5 years	1967, 1972	1977

Of these the most important to planners are the Census of Population and Housing. Other censuses have considerable utility and should not be neglected. The key reference work to the Bureau's publications is Bureau of Census Catalog of Publications: 1790-1972. For the most recent publications see the Data Users News (formerly the Small Area Data Notes) a monthly publication that lists the availability of new materials.

Of critical importance are the types of areas for which data are collected. These various levels are noted below.

STATISTICAL-AREAL UNITS USED IN THE
1970 CENSUS OF POPULATION

Blocks

Enumeration districts or block groups

Census tracts

Minor civil divisions or census county divisions

All places
    places greater than 1,000 only
    places greater than 2,500 only
    places greater than 10,000 only

Counties

Urban/rural parts of counties

Standard metropolitan statistical areas

Urbanized areas of SMSAs

Components of SMSAs

Congressional districts

Divisions

Regions

Zip Codes

Source: U.S. Bureau of the Census, Data Access and Use Laboratory. "Using Census Data: Concepts, Publications, Computer Tapes, Other Products." An Instructor's Reference Manual, by Cynthia M. Taeuber (Washington, D.C.: 1974), p. 10.

Not all data collected by the Bureau is available in published form. A document helpful to both students and the instructor for gaining access to census material is

"Using Census Data: Concepts, Publications, Computer Tapes, Other Products," An Instructor's Reference Manual, by Cynthia M. Taeuber (Washington, D.C.: 1974). Of particular interest to instructors are some of the Data User Services Division's publications. The *Student's Workbook on the 1970 Census* contains several useful exercises on how to collect information from the census. The division also publishes *Census Data for Community Action,* a very useful document containing information on data in the census of use to planners.

A recent project of the Bureau's will be of interest to planners. Several urban atlases have been produced. Done at the SMSA scale these atlases contain computer prepared color maps showing selected socio-economic characteristics by census tract. The Bureau is making the digitized files and tract data tapes available to local users to prepare their own maps. Plans call for atlases to be prepared for all SMSAs in the country.

Several standard type reference works published by the Bureau should be noted. These include the *Statistical Abstract of the United States*, (Washington, D.C.: Government Printing Office, 1879 to date) and the *County and City Data Book,* (Washington, D.C.: Government Printing Office, 1952 to date).

The *Statistical Abstract of the United States* serves as a guide to the statistics of national importance, as well as, serving as a reference to further information via the sources listed in the tables. Data is mainly presented in tabular form which lends itself to quick interpretation and easy in use. A period of several years are covered in the statistics cited which is helpful when comparisons are needed.

On a smaller scale but following much the same format is the County and City Data Book. Here information included is based on the last census. Areas covered include cities, congressional districts, metropolitan areas, regions and some small urban centers.

Another source, the Congressional District Data Book, offers a breakdown of statistics by congressional districts. This can be helpful in gathering county statistics, as many of the districts follow county boundaries.

Two other valuable resources published by the Bureau are, Directory of Federal Statistics for Local Areas and Directory of Federal Statistics for States.

XI. Other Reference Tools
    A. Trade Publications
    B. Standard Industrial Classification
    C. Planning Librarians' Bibliographies

Thus far a wide variety of tools have been discussed. For the most part these are mainly illustrative, as it would be an impossible task to identify all the materials a planner might need to consult. Three other tools not previously covered are Standard Industrial Classification Trade Publications, and the Planning Librarians' Bibliographies.

Standard Industrial Classification is a numerical system developed by the U.S. Office of the Budget for identifying types of economic activity. This system with its two, three and four digit identifiers, is used in the collection of census data and frequently employed by planners in classifying economic activities.

On occasion planners may wish to develop information on markets and consumer expenditure patterns. There are several trade publications which offer data on population, consumer expendible income and retail sales. Among these are Editors and Publishers Market Guide Annual, Standard Rate and Data - Newspaper Rate and Data, and Sales Management: Survey of Buying Power.

Well over a thousand bibliographies have been published by the Council of Planning Librarians. A particularly useful bibliography published by the Council is A Survey of Planning Information in Standard Reference Books.

STUDENT READING LIST

I. Location of Library Materials

A good source for students on this topic is found in:

Durrenberger, Robert W., Geographical Research and Writing, (New York: Crowell, 1971), pp. 42-50.

II. Bibliographic Guides to Reference Materials

A good source for students on this topic is found in:

Katz, William, Introduction to Reference Work, Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 32-36.

available from the United States Government Printing Office. The *United States Monthly Catalog* and the *Selected United States Government Publications* will prove helpful in locating maps published by the GPO.

International Maps and Atlases in Print is a guide to current world mapping. Information is given on the maps and atlases which are published throughout the world. Of particular interest to planners will be the section on the United States which provides a comprehensive guide to U.S. mapping, including publications by private firms and government agencies. Included are town plans, county maps, and specialized atlases.

The U.S. Geological Survey is the nation's primary mapping agency. Its topographic maps are generally the best base maps available for planners. The Survey publishes various indexes showing the status of mapping by states. The most useful series is the 7½ minutes series which is published at a scale of 1:24,000.

Sandborn maps are prepared primarily for insurance purposes but contain some sueful information for planning, such as, the shape, number of stories, and type of construction. Usually, they are available for most large and medium sized American cities.

Two important sources of local maps, and frequently the only maps at a planner's disposal, are engineering maps and tax maps. Engineering maps are usually maintained by the public works or the engineering department of the city.

III. - VII. Standard Bibliographic Aids

A good source for students on these topics is found in:

Katz, William, Introduction to Reference Work, Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974).

VIII. Guides to Government Documents

A good source for students on this topic is found in:

Katz, William, Introduction to Reference Work Volume I, Basic Information Sources, (Second Edition; New York: McGraw-Hill, 1974), pp. 328-336.

IX. Map Sources

A good source for students on this topic is found in:

Chapin, F. Stuart, Jr., Urban Land Use Planning, (Second Edition; Urbana: University of Illinois Press, 1965), pp. 257-264.

X. Census Material

A good source for students on this topic is found in:

Dent, Borden D. (ed), Census Data: Geographical Significance and Classroom Utility, (Tualatin, Oregon: Geographic and Area Study Publications, 1976).

INSTRUCTIONAL STRATEGIES

It is imperative that this course be a "learn by doing" course. The best, and really only way, to learn how to locate planning data is to be given practical experience.

It is suggested that the instructor discuss the assets and liabilities of various reference tools. Students should then be given specific problems in which they are to collect specific information related to planning problems. Care should be taken to have the students collect data in a usable form. Where possible students should be asked to search out materials in several different libraries - this will help in the development of good research habits.

METHODS OF EVALUATION

The instructional strategy suggested previously lends itself well to development of a means of evaluation. However, not all stress should be places on this rather mechanical task. The real measure of a student's competency in this area comes from being able to identify and utilize materials in addition to those covered by the instructor.

AN INSTRUCTIONAL MODULE FOR FORMAL COMMUNICATIONS

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URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

STATEMENT OF OBJECTIVES

The purpose of this course is to explicate formal communications in terms of both written and oral communications. This explication will help to further and enhance communications between the urban technologist and other professionals. The purpose of this course can further be broken down into the following areas of concentration:

- components of communications - both oral and written
- oral communications - pitfalls and corrective measures
- talking and listening techniques
- writing skills
- viable practical examples of both written and oral communications (professional to professional)
- communications options

INSTRUCTIONAL OUTLINE

I. How Does the Urban Technologist Communicate
  A. Transfer of meaning
    1. synchronization of thinking between Person A and Person B
    2. what do words mean
  B. Professional communication
    1. technical language
    2. speaker-listener alternation
    3. description vs. interpretation
  C. Language and communication blocks
    1. misuses of language
    2. simple words have many meanings
    3. assumption vs. verification
    4. fact vs. inference

For teaching techniques on technical communications, see:

Campbell, John M. *et al*, *Effective Communications For the Technical Man*, (Petroleum Publishing, 1972). Volume 1: *Communications Science and Technology: An Introduction*, Penland, P.; Volume 2: *Interpersonal Communication*, Penland P. and Mathai, A.; Volume 3: *Group Dynamics and Personal Development*, Penland P. and Fine S.; Volume 4: *Community Psychology and Coordination*, Penland, P.and Williams, J. (Dekker, 1974).

A lecture-discussion series useful in the classroom is:

Lee, Irving and Laura Irving, *Handling Barriers In Communication*, (San Francisco: International Society for General Semantics, 1968).

II. Frequently Used Verbal Patterns or How Language is Used
  A. Time pattern
    1. sequence of events
    2. direction or goal
  B. Conjunctive sectional pattern
    1. part independent of other part; unity derived from broader context
    2. use of conjunction "and"
  C. Disjunctive sectional pattern
    1. mutually exclusive
    2. use of conjunction "or"
    3. analysis and evaluation (preparation for report writing)
  D. Analogical sectional pattern
    1. find differences in similar things and vice versa
    2. physical and behavioral
  E. Cause to effect pattern
    1. controlled manipulation of relevant factors
    2. working with physical subject matter
    3. cause-effect in social relationships
  F. Means to an end
    1. operations toward an objective
    2. looking toward the future
    3. predictability depends on nature of subject matter
  G. Signs and symbols
    1. identification
    2. connotation
    3. suggestion

A source for typical verbal patterns is:

> Sondel, Bess, The Humanity of Words, (Cleveland: World Publishing Company, 1958). May be out of print.

An educational film dealing with communications is:

> "Mind the Gap" -- a 20 minute film exploring problems of perception. Student interaction on the overcoming of communication gaps.

A more technical source of information on general semantics is:

> Hayakawa, S.I., Language in Thought and Action, (third edition; New York: Harcourt Brace Jovanovich, Inc., 1972).

III. Elements of Report Writing
- A. Relating to the reader
  - 1. reading level
  - 2. audience
  - 3. approach
- B. Defining subject or problems
  - 1. statement of objectives
  - 2. defining issues
- C. Structuring a report
  - 1. order of thinking
  - 2. logical presentation
  - 3. emphasis
  - 4. conclusions
- D. Use of language
  - 1. sentence construction
  - 2. paragraph construction
  - 3. vocabulary -- use of jargon, pretentious language
  - 4. coherence
  - 5. verb tenses

A source of useful information on report writing is:

> Sigband, Norman B., Effective Report Writing, (New York: Harper and Row, 1960).

Presentations concerning report writing and the technical aspects of report writing can be found in:

> Douglass, Paul, Communication Through Reports, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1957).

Dallaire, Gene, "Improving Your Writing,"
Civil Engineering, ASCE, January 1975.

A useful industry publication is:

Federal Electric Corporation, *How to Write Effective Reports*, 1965. (teacher's manual available)

IV. Annual Reports
A. What an annual report should do
1. report
2. compare
3. look ahead
4. interpret
5. communicate
6. gain support
7. checklist
B. Elements of the annual report
1. cover letter from chairman
2. information on commissioners
3. functions of commission
4. number of meetings held
5. appeals
6. merit system cases in litigation
7. report on legal opinions
8. rules and revisions
C. Making statistics work
1. numbers that talk
2. text tables
3. charts, graphs
4. pictographs

The most concise source of information on this subject area can be found in:

Matthews, Lempi K., *Making the Most of Your Annual Report*, (Chicago: International Personnel Management Association).

Another source of professional communication in this area is:

Herman, Harold W., "The Annual Report: A Public Relations Tool," (Urbana, Illinois: *Journal of the College and University Personnel Association*, Volume 12, Number 4, July 1960).

V. Getting a Municipal Report in Print
A. How to work with the printer
1. preparation of copy
2. key artwork and special material

   3. build samples file
   4. printer's vocabulary (technical language)
   5. letterpress vs. offset

B. Reproducing copy
   1. typed copy
   2. spacing
   3. ink and paper color
   4. line length

C. Scheduling
   1. plan ahead
   2. meeting deadlines

D. Preparing copy for printer
   1. copy fitting
   2. marking and correcting copy
   3. proofreading
   4. selecting weight of paper
   5. asking questions

A good source for additional information is:

> Melcher, Daniel and Larrick, Nancy, *Printing and Promotion Handbook*, (New York: McGraw-Hill Book Company, 1956).

VI. Other Methods of Relating to Municipal Professionals

A. News media
   1. press conference
   2. newspapers
   3. television

B. News releases
   1. public relations
   2. image

C. Telephone
   1. capsule conversation
   2. preparations
   3. cost factors

A useful article on public relations is:

> Scandlyn Sammie Lynn, "The Kansas City Story," (Nation's Cities, September 1967).
>
> Zelter, Robert L. and Crouch, W.G., *Successful Communication In Science and Industry: Writing, Reading, and Speaking*, (New York: McGraw-Hill Book Company, 1961). (teacher's guide to course of study)

STUDENT READING LIST

I. How Does the Urban Technologist Communicate?

A very useful college text on communications is:

> Potter, David and Andersen, Martin P., *Discussion: A Guide to Effective Practice*, (Second edition; Belmont, California: Wadsworth Publishing, 1970).

II. Frequently Used Verbal Patterns or How Language Works

An excellent text and source for a wide variety of information on language from a psychological perspective is:

> DeVito, Joseph, *The Psychology of Speech and Language: An Introduction to Psycholinguistics*, (New York: Random House, 1970).

Other texts useful to students are:

> Murray, Elwood; Phillips, Gerald and Truby, David, *Speech: Science-Art*, (Indiana: Bobbs-Merrill Company, Inc., 1969).

> Vygotsky, Lev S., *Thought and Language*; Translated by Eugenia Haufman and Gertrude Vakar, (Cambridge, Massachusetts: MIT Press, 1962).

Professional communications can be improved by such books as:

> Haney, William V., *Communication and Organizational Behavior*, (Third edition; Homewood, Illinois: Richard D. Irwin, Inc., 1973).

> Lee, Irving, *How to Talk With People*, (Scranton, Pennsylvania: Harper & Row Publishing, Inc., 1952).

III. Elements of Report Writing

A *must* guide to style for every student is:

> Strunk, William Jr. and White, E.B., *The Elements of Style*, (New York: Macmillan Book Company, 1959).

Another useful style guide is:

A Manual of Style, (Twelfth edition; Chicago: The University of Chicago Press, 1972).

IV. Annual Reports

The university library should contain copies of actual annual reports from various municipalities. Typical examples of such reports are:

Department of Environment and Streets - City of Atlanta, 1974.

Department of Engineering - City of Syracuse - Annual Report, 1975.

Department of Streets and Sanitation - City of Chicago - Annual Report, 1971.

Public Works Department - Tulare County, California, Annual Report, 1974-75.

Suggested article on this topic is:

Rombold, Charles C., "Annual Reports," A Manual for Park and Recreation Departments, (Washington, D.C.: National Recreation and Park Association, 1967).

The student should also use the Matthews book on *Making the Most of Your Annual Report*.

V. Getting a Municipal Report in Print

The best method of assisting students in this area is to have them visit a local printer. First, there should be some sort of classroom work to explain printing techniques and language and then the visit to the printer. The printer should then explain how the systems work.

VI. Other Methods of Relating to Municipal Professionals

A useful text on this subject area is the student edition:

Zelter, Robert L. and Crouch, W.G., *Successful Communication in Science and Industry: Writing, Reading and Speaking*, (New York: McGraw-Hill Book Company, 1961).

INSTRUCTIONAL STRATEGIES

I. How Does the Urban Technologist Communicate?

A. Transfer of meaning

Basically, communication is the transfer of meaning from the mind of Person A to the mind of Person B. Or, restating this point, both people must synchronize their thinking if they are to understand one another. The process may seem simple, but there are many factors that thwart the transfer of meaning, e.g., people attach different meanings to the same word.

Therefore, a good method of presentation is to have one student select another student from the class. The first student will play the role of the urban technologist. The second student will be a public works official, for example, who wants the urban technologist to assist him in a project to check the municipal sewer system in an area where flood damage has occurred. The public works person thinks he is an experienced professional with all the answers. The urban technologist wants to make a few professional suggestions. The two students should determine the scenario before class.

For their classroom presentation, the two students should carry on a ten minute conversation between the technologist and the public works official. The class should listen, make notes and pay close attention to the interaction. A tape should also be made of the conversation to provide a factual account of what is being said.

Then, the students in the class should decide how well each participant conveyed his side of the issue. How well did they talk to each other? What did they really say? What do their words mean? How well did each one listen? Did they understand each other?

After the class discusses the conversation, a list should be drawn up stating the conclusions of the class, e.g., the urban technologist failed to communicate the idea that a review of the solid waste system indicated several environmental problems; or, the public works person assumed the urban technologist understood him because he is so familiar with this type of situation; or, the urban technologist was able to clearly explain the need for consulting a planner on this problem.

Once all the data has been correlated, the tape should be replayed. What do the students hear when they listen to the actual conversation? How well did they listen? How well did they understand what was actually being said?

This type of exercise is designed to help the student communicate better. He or she finds out if they know how to listen, and if they can understand how people interact. They should also be able to make suggestions on how to improve communications.

Obviously, the best way to learn to communicate is to do it. Then, it is essential to set up situations that will simulate actual on-the-job communications between professionals to prepare them for realistic communications they may encounter.

B. Professional communications

The student should be given a list of about one hundred technical terms he will encounter on the job. The student is responsible for doing library work on this terminology. He should look up the terms and learn what they mean in terms of his profession. For example, the word family conjures up many different images. However, look up this word in five different zoning ordinances, and you will find five different meanings. And, in the world of printing, the word family means a group of typefaces based on a common design. The word thimble is another simple example. To a building inspector, a thimble is an element of a chimney. To the layman, a thimble is a finger protector.

After the student has looked up these terms and found many different meanings, he should be asked to use them in a professional situation. Suppose, for example, the urban technologist is meeting with a planner. They are discussing the rehabilitation of a particular area. What technical terminology would enter into the conversation? What do these terms mean in a professional sense?

C. Language and communications blocks.

The student should be given a list of communications problems. Then, he should work on filling out this chart and discussing the chart in the classroom. Naturally, the instructor should, at all times, be discussing communications techniques in the classroom. And, all instruction should involve classroom participation, questions, answers, role playing and so on.

The following is a suggested chart with examples of how to fill it in:

SUBJECT	PROBLEM/LIMITATION	CORRECTIVE MEASURE
reality	we perceive only part of it	not much we can do about it
perception process	input by our senses	?
abstraction process	this is way each of us perceives, selects, and evaluates reality. We consider our version as "fact."	Check with others before you claim your "facts" are correct.
triangle of meaning	?	When people are hazy about your referents, point out the referent, draw a picture, make things clear
map analogy	verbal map should be similar in structure to "territory" it is intended to represent.	?
feedforward	?	Use a pattern: time cause-effect space means-end sectional
feedback	Feedback is corrective information. When absent, communicator cannot be certain message is being understood.	Strive for feedback and look for it. It may be non-verbal.
naming things	What we call things depends on our social and educational background.	Don't argue whether a name is correct. Find out whether you are talking about the same thing. Know your technical terminology. Ask questions

elementalism	This is what we call process of arbitrarily making distinctions with language.	?
either-or orientation	Our language tends to make either-or distinctions: day and night, guilty-inno-	Develop infinite valued orientation: e.g., try to look in between extremes.
audience	?	Ask, who is the person I want to reach? Will he be interested in what I say? How do I interest another professional when he may know subject better than I do?
visual and verbal languages	While both are called "language" they function quite differently.	Verbal language is not easily translated into visual. Higher level verbal abstractions often difficult to visualize.
Group discussions	?	Ask what group is doing. Group purposes may overlap.

This chart involves the student's own perceptions and interpretations of how to communicate more effectively. This chart, once completed, should generate several classroom discussions on how each individual feels a communications stumbling block can best be resolved. Then, utilizing these corrective measures, students should be asked to prepare a professional scenario utilizing their new-found methods of correcting communications problems. For example, the mayor has called a meeting. The people in the Wallington Section of the city are protesting the construction of a low-income high-rise in their neighborhood. They claim it will cause a decrease in property values, congested parking, more traffic at the intersection, destroy a playing area for children, etc. This is a closed meeting between the mayor, his commission on public safety, the city planner, the zoning inspector, the building official, the public works official, the tax assessor, the urban technologist and so on. How do all these people communicate, taking into account their professional perspectives, personal opinions, public welfare and community reaction?

II. Frequently Used Verbal Patterns or How Language Works

A. Time pattern

Time pattern involves a classroom discussion of time sequence of things or events. This indicates a direction or a goal for the urban technologist. One excellent method of presentation is to use a telephone conversation. The urban technologist has to call a planner to discuss an environmental study. He must decide what it is he wants to know, what direction the project is taking, when the project will be completed, and what will be achieved upon completion. The student should learn how to think through a project or question, and either write down or verbally enumerate the topic.

B. Conjunctive sectional patterns

This means a sentence, title or heading where the parts are relatively independent of each derive their unity from a broader context. For example, the student should be given a list of report titles such as the "socio-economic and political aspects of municipal government." The major parts of a conjunctive sectional pattern are joined together by the conjunction "and". How does the conjunction work? What does it imply about the title? What factors are actually being discussed? This is a useful classroom exercise because it shows the student how to put ideas and concepts together in preparation for report writing.

C. Disjunctive sectional pattern

This follows as above. However, the major parts of a disjunctive sectional pattern are mutually exclusive. The characteristics of this pattern involve the use of the conjunction "or". For example, are you making reference to Report 1 or Report 2? This helps in both verbal and written communications.

D. Analogical sectional pattern

This pattern makes it possible to see the differences in similar things, and the similarities in different things. For example, the similarities in an urban technologist's job function and a planner's job function; and, the differences in their respective job functions.

A useful classroom exercise would be to assign people to different municipal offices. Each group would have to list the job functions of their particular municipal official. Then, they would have to list the similarities and differences between the urban technologist and the official.

1. Similarities between planner and urban technologist:
    - a. concern with zoning
    - b. concern with air pollution control
2. Differences between planner and urban technologist:
    - a. concern with zoning (in terms of authority)
    - b. concern with air pollution (in terms of authority)

G. Signs and symbols

The best way to understand the difference between these two words is to start looking around and making lists to be discussed in class. A stop sign conveys a message that is agreed to mean stop your car, look both ways, and then proceed with care. This is literally a sign . An example of a symbol is the American flag. What images or emotions does this symbol conjure up in one's mind.

III. Elements of Report Writing

A. Relating to the reader thru C. Structuring a Report

Each student should write a report. This report should be written to a particular municipal professional from the point of view of the urban technologist. First, the student should have to submit an outline giving not only the content of the report, but also all related communications considerations such as reading level, audience and approach. The student might have to write a report on the means of egress facilities in an office building as part of his work for a building department. To whom does the report go? What does the urban technologist want to say?

The student should be considering a number of points:

- Is the report to inform, to create a public image, to evoke a response?
- Be certain of the topic addressed in the report

- Write to the highest calibre of the reader
- Clarify thinking on the subject
- Gather all necessary information
- Take a stand
- Organize the material
- Make the report look presentable

A variety of considerations should be taken into account. This report should be used as part of the final examination. It is essential that this be broken down into a number of steps so that the student can either do a report (considering all phases of communications work) or parts of an annual report (considering all phases of communications work).

First, the instructor should spend classroom time discussing all the elements of report writing. In so doing, the instructor should be placing emphasis upon a variety of techniques. At the same time, emphasis should be placed on the idea that reports are an essential part of professional communications. Moreover, the report is one of the most effective means of written communications between municipal professionals. And, a report is a written and permanent record of the urban technologist's assessment or evaluation of a particular subject or area of concern.

D. Use of language

One of the most effective means of presenting language use is the worksheet. The instructor should compile a series of worksheets covering basic grammer review. The worksheets should cover parts of speech, phrases, clauses, sentence structure and so on. These should be given as homework assignments to the students, and then checked in class by means of blackboard work. Grammar review is essential because many students either forget basic grammar rules or really have never understood grammar. Without a working knowledge of grammar, the student will be unable to write an effective report. When working with the grammar, emphasis should be placed on the logical ordering of words, ideas, and concepts. The student should work with scrambled sentences. What is the best order of presentation? How would you order them if you wanted to achieve a different purpose? Why?

IV. Annual Reports

A. What an annual report should do

The components of the annual report should be listed. Then the student should be required to go to the library and look up at least three annual reports. He should decide how these reports are put together and how well they are put together. Then, he should be assigned a typical topic for a section of an annual report that might be written by an urban technologist. According to the topics listed, he should be able to write an outline indicating the parts of the report. Direction should be provided by the course instructor.

The instructor should explain the function of each part of the annual report. For example, how does an annual report compare statistics? It can compare the record of this past year with the previous year or several prior to that. The information should help the reader to understand exactly what has transpired and what direction the urban technologist (department) intends to take. If the comparison shows real gain, the reader can then easily spot this in the report. If there have been losses or problems, then the reader can face these facts and find out, via the report, how the urban technologist plans to deal with such problems.

When appraising an annual report, the reader should be able to find answers to typical questions including:

- --Are major accomplishments of the past year clearly stated?
- --Does the report discuss problems as well as accomplishments?
- --Do you give the reader enough background on your organization or department? Do you spell out the department's direction?
- --Do you explain the significance of changes made during the year?
- --How do you place emphasis on the good job you've done?
- --The report must be presentable and eye-catching
- --Are there effective transitions between topics?
- --Are the statistics easy to understand? Are they placed so as to be an addition rather than a detraction from your report?

C. Making statistics work

The instructor should assign the student a table or some other typical statistic found in an annual report. The student should study the statistic and decide whether he believes it is effective in the report. Then, he should state his conclusions in writing. He should also have to design statistics of his own. The student should look at a number of annual reports to learn how statistics work. The instructor should spend one or two classroom sessions teaching a simple course on statistics and their function in the annual report because most annual reports rely a great deal on statistical materials.

V. Getting a Municipal Report in Print
A. How to work with the printer

The instructor should teach printing via the use of actual copy. Typesetting the copy is essential to producing a clearly printed report. Emphasis should be placed upon the relationship with the printer. Obviously, the better the liaison with the printer, the better the product. Technical language is involved again, and the student should learn the terminology used by printers, e.g., typeset, galley, page proof, pastup, etc. The student will have to learn the technical aspects of choosing a typeface, column width, spacing between lines and so on.

The student should learn to look at previous reports and begin assembling a particular style in his mind. Each municipality may have its own set format, but should they wish suggestions on a new style, the urban technologist should have an idea on how to work with the printer.

One of the most effective learning experiences is to actually visit a printing plant or to have a printer talk to the class. The student can then observe, first hand, how the many operations actually work. Obviously, visiting a printer would be ideal. The student would then learn why each procedure is required and how it works toward putting out a well-printed copy of a report.

VI. Other Methods of Relating to Municipal Professionals
A. News media - B. News releases

Students should assume the roles of urban technologist and reporter. For example, suppose the airport authorities had been receiving massive complaints from the public concerning noise from the SST. The public works department assigned the urban technologist the task of looking into the problem and meeting with the press to read a statement for the media. How would the urban technologist approach this problem? What would he say? What kind of image should he present? What does public relations mean? How does public relations work?

The instructor should teach a class on media and public relations so that the student understands image-making, message via media and so on. Students should also practice writing sample press releases on a variety of topics.

C. Telephone

One factor not always realized in some municipal agencies is that it is usually less expensive and more efficient to use the telephone than write a letter. Therefore, practical training in communications via the telephone is essential to a full education in this area. The student should once again have to speak to a municipal professional about a particular topic. The instructor is responsible for explaining business telephone techniques. Students should work on practical projects such as actual telephone conversation in class. Various techniques should be discussed such as research, jotting down notes, personality profile, and so on.

METHODS OF EVALUATION

1. The student should be required to write a report in a particular subject area of professional concern to the urban technologist. This report should be done with the approval and guidance of the instructor. The instructor should list a variety of topics for the student so that they may either

select a topic or obtain approval for their own topic. The initial outlines, preparations and so on should be checked, at each stage, by the instructor. The remainder of the report writing tasks will be done by the student. The student will hand in his final report as part of the final examination.

2. The student should be required to write a statistical portion of an annual report. The statistical presentation should involve the use of at least three different types of statistics. This report should be accompanied by a statement telling the instructor what the student believes the statistics are communicating. This also should be handed in at the time of the final exam.

3. The student should be required to engage in one role-playing activity for a graded evaluation. This role-playing should involve a typical professional communications situation that might involve both the urban technologist and another municipal professional. This grade should be counted toward the final grade for the course.

4. The student should be required to mark up several pages of manuscript and prepare this manuscript for the printer including all printer directions. The instructor should evaluate this work according to the use of the correct technical procedures, use of style and projected final appearance of the manuscript. This grade should be part of the final grade for the course.

5. The student should be required to interview a professional municipal official concerning a topic of interest to the urban technologist. After this interview, the student should either (a) give an oral report to the class, (b) write a report on the interview, (c) issue a press release, (d) select some form of formal communications to explain what transpired. This classroom exercise should be applied toward the student's final grade for the course.

The above exercises are practical, skill-oriented examples of how to test the verbal, written and technical skills learned in this course.

AN INSTRUCTIONAL MODULE FOR COMPUTERS IN PLANNING

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URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

STATEMENT OF OBJECTIVES

To introduce students to digital computers and some of their uses in planning and public works activities. Students will learn the rudiments of computer programming as applied to typical planning problems and the use of packaged programs available in some planning and/or public works agencies. The purpose of this module is to educate students to be intelligent users of computers, i.e., to be able to recognize real world problems that can be efficiently solved on computers and to be able to contribute to that problem-solving process. In order to do so, students will learn how to develop computer solutions for problems and how to write simple programs.

INSTRUCTIONAL OUTLINE

I. Introduction to Computer Systems, their operation, and history
    A. Hardware
        1. memory
        2. central processing unit
        3. input-output
        4. number representation
    B. Software
        1. machine language (object programs)
        2. programming language (subject programs)
    C. History

Many introductory texts in computers cover these topics.

For example, see:

Kennedy, M. and Solomon, M., *Eight Statement PL/C, (PL/Zero) Plus PL/1*,(New Jersey: Prentice-Hall, Inc., 1972), pp. 3-4; pp. 392-396; pp. 417-418.

Kennedy, M. and Solomon, M., Ten Statement Fortran Plus Fortran IV, (New Jersey: Prentice-Hall, Inc., 1970).

Forsythe, A., Keenan, T.A., Organick, E.I., and Stenberg, W., Computer Science: A First Course, (New York: John Wiley & Sons, 1969).

- II. Problem Solving Using a Computer
  - A. Flowcharting
    - 1. purpose
    - 2. symbols
    - 3. examples
  - B. Algorithms
    - 1. relationship to flow charts
    - 2. examples

Kennedy, M. and Solomon, M., Eight Statement PL/C, (PL/Zero) Plus PL/1,(New Jersey: Prentice-Hall, Inc., 1972), pp. 5-9; pp. 382-391.

- III. Problem Analysis and Data Preparation
  - A. Analysis of problem common to planning and public works
    - 1. introduce "land use data bank" problem or similar exercise (see instructional strategies)
    - 2. develop strategy for solution
    - 3. students implement solution (see III B)
  - B. Keypunch
    - 1. Hollerith card as data input
    - 2. data preparation using keypunch
    - 3. advantages and limitations
    - 4. use by students

Kennedy, M. and Solomon, M., Eight Statement PL/C, (PL/Zero Plus PL/1, (New Jersey: Prentice-Hall, Inc., 1972), pp. 379-382.

- IV. Introduction to Programming
  - A. Basic PL/C
    - 1. elements of the language
    - 2. overall structure of a program
    - 3. input statements
    - 4. output statements
    - 5. arithmetic statements
  - B. Relationship to flowcharting
  - C. Program debugging
    - 1. error messages
    - 2. debugging strategies
  - D. Exercises

Kennedy, M. and Solomon, M., *Eight Statement PL/C, (PL/Zero) Plus PL/1*, (New Jersey: Prentice-Hall, Inc., 1972), pp. 10-15; pp. 16-36; pp. 117; pp. 254-258; pp. 477-493.

V. Decision Making
   A. Flowchart representation
      1. statement labels
   B. IF statements
      1. Boolean conditions
   C. Unconditional transfer
      1. GO TO statement
   D. Applications

Kennedy, M. and Solomon, M., *Eight Statement PL/C, (PL/Zero) Plus PL/1*, (New Jersey: Prentice-Hall, Inc., 1972), pp. 46-55.

VI. Interaction Control
   A. Flowchart representation
   B. Looping
      1. create index
      2. modify index
      3. test and branch
   C. DO loops
      1. conditional
      2. nested
   D. Applications

Kennedy, M. and Solomon, M., *Eight Statement PL/C, (PL/Zero) Plus PL/1*, (New Jersey: Prentice-Hall, Inc., 1972), pp. 82-86.

VII. Multiple Valued Variables
   A. Flowchart representation
   B. Subscripted variables
      1. single subscripts
      2. double subscripts
      3. other
   C. Applications

Kennedy, M. and Solomon, M., *Eight Statement PL/C, (PL/Zero) Plus PL/1*, (New Jersey: Prentice-Hall, Inc., 1972), pp. 87-96.

VIII. Input/Output Editing
   A. Data organization
      1. fields
      2. records
      3. blocks
   B. Character representation
      1. fixed
      2. floating
      3. alpha/numeric

C. Input/Output
    1. GET statements
    2. PUT statements

Kennedy, M. and Solomon, M., Eight Statement PL/C, (PL/Zero) Plus PL/1, (New Jersey: Prentice-Hall, Inc., 1972), pp. 170-188.

IX. Packaged Programs -- statistical applications
    A. Statistical programs (e.g., SPSS)
        1. the role and function of statistical programming packages
        2. introduction to SPSS as one example of a statistics package
    B. Organization of SPSS program
        1. coding and data input
        2. control cards
        3. files and data definition
        4. tasks
        5. runs
        6. processing files
    C. Introduction to statistical programs
        1. one-way frequency distribution
        2. measures of central tendency
        3. measures of dispersion
        4. two-way contingency tables

Nie, N.H., Hull, C.H., Jenkins, J.G., Steinbrenner, K., Bent, D.H., SPSS-Statistical Package for the Social Sciences, (second edition; New York: McGraw-Hill, Inc., 1975), pp. 1-20; pp. 21-35; pp. 35-86; pp. 181-201; pp. 218-245.

X. Packaged Programs -- mapping applications (as time permits)
    A. The SYMAP package
        1. contour maps
        2. conformant maps
        3. proximal maps
        4. program preparation
    B. The SYMVU package
        1. contour maps
        2. conformant maps
        3. program preparation

Dudnick, E.E., SYMAP - Users Reference Manual for Synographic Computer Mapping, (Chicago: Department of Architecture, University Illinois at Chicago Circle, 1974).

SYMVU Manual, Version 1.0, Laboratory for Computer Graphics and Spatial Analysis, (Harvard University, Cambridge, Massachusetts, 1971).

STUDENT READING LIST

Because this is a skills oriented course, students should devote most of their time to reading and understanding the material outlined under the instructional outline and doing related problems as specified by the instructor (see instructional strategies for some sample problems). Additional background and applications material for those students with special interests in this topic can be found in various texts, including:

> Rothman and Mosmann, Computers and Society, (Science Research Associates, Chicago, Illinois).
>
> Fite, H.H., The Computer Challenge to Urban Planners and State Administrators, (Washington, D.C.: Spartan Books, 1965).
>
> Benton, W.K., The Use of the Computer in Planning, (Reading, Massachusetts: Addison-Wesley Publishing Company, 1971).
>
> U.S. Department of Housing and Urban Development, Urban and Regional Information Systems: Support for Planning in Metropolitan Areas, (Washington, D.C., U.S. Government Printing Office).

The instructor should select those topics for optional background reading assignments which are of most interest to a particular class.

INSTRUCTIONAL STRATEGIES

This is a problem oriented course designed to teach students specific programming skills rather than provide them only with information about how computers may be used in planning and public works. Without such specific computer skills, the urban technologist could not perform any computer-related activities in a planning or public works agency.

Material on computer concepts and on programming is included in the course so that the student will be able to recognize real world problems that could be solved on a computer. In many ways, this material is more important to the student than learning the mechanics of using packaged programs such as SPSS or SYMAP. With a sufficient grounding in computers and programming, students could learn to use most packaged programs on the job, if necessary. Many professional offices will have access to programming packages other than SPSS or SYMAP (e.g. BMD, SPP, IBM software, etc.) so students should be able to learn how to use such programs with minimal guidance.

Because of the technical nature of the material covered in this course, it is important that the instructor have a background in computers and programming. He should select one introductory programming text for the topics noted under the instructional outline depending on the programming languages available at his computer facility. Reading assignments and problems on these topics should be based primarily on the selected text. It will be very confusing for students if they have to jump from one programming text to another in covering this technical material.

Examples of laboratory exercises which emphasize various programming concepts and applications of computers to urban problems are presented here.

Design of a Simplified Land Use Data Bank

Included with this problem are:

(a) a copy of a portion of a property (tax) map of an urban area (see Figure 1).

(b) a table showing additional information about the land parcels listed on the map (see Table 1).

The problem to be dealt with is that of designing a land use data bank for the properties described on the forms stated above. Information concerning these properties has been gathered from various official records and is listed on both forms. Hollerith cards will be the primary medium for storing the information selected to go into the data bank. The layout of the information on these cards should be designed so that they will be able to be processed by commercially available digital computers.

A few comments on terminology are in order. In this example, a "record" is defined as the set of attributes describing one parcel of land. A "file" can be defined as a set of similar records; in this case, the property file consists of all of the available parcel records. The data bank, in this example, consists of only this one file.

When you have completed this problem, turn in the following information:

(a) the design or layout of the basic record used in your data bank

(b) a correct listing of the complete property file

(c) your justification for including each data item in a record

(d) your justification for excluding any of the available data items from a record

(e) specify any other information you might like to have in your land use data bank and the reasons why

(f) 1. in all of your answers, please be brief
    2. save your property file for use in a subsequent problem

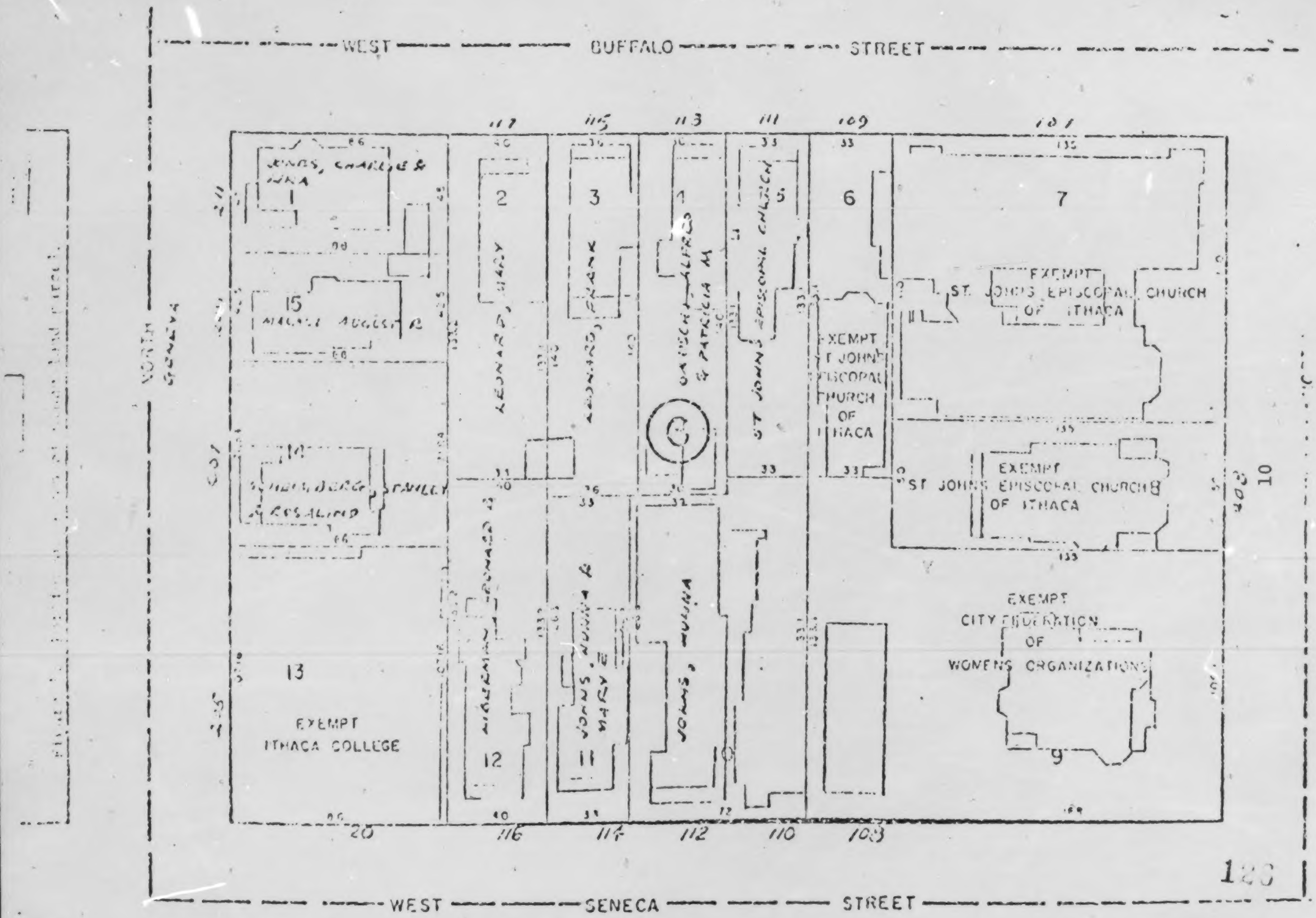
WEST BUFFALO STREET
WEST SENECA STREET
NORTH GENEVA
117
115
113
111
109
101
1
JOHNS, CHARLES & ANNA
2
LEONARD, MARY
3
LEONARD, FRANK
4
GAISCH, ALFRED & PATRICIA M
5
ST JOHNS EPISCOPAL CHURCH
6
EXEMPT
ST JOHNS EPISCOPAL CHURCH OF ITHACA
7
EXEMPT
ST JOHNS EPISCOPAL CHURCH OF ITHACA
8
EXEMPT
ST JOHNS EPISCOPAL CHURCH OF ITHACA
9
EXEMPT
CITY FEDERATION OF WOMENS ORGANIZATIONS
10
11
JOHNS, NORMA R
MARY E
12
LEONARD R
13
EXEMPT
ITHACA COLLEGE
14
STANLEY
ROSALIND
15
AUGUST R
G
20
116
114
112
110
108

TABLE 1: Additional information about the parcels listed on the map in Figure 1:

BLOCK NO	PARCEL NO	AREA[1]	LAND USE	YEAR BUILT	VALUE[2]	CONDITION
6	1	3,807	Res	1888	18,350	1
6	2	4,522	Res	1897	13,500	3
6	3	5,040	Res	1927	19,100	2
6	4	5,040	Res	1888	12,560	3
6	5	4,389	Res	1890	11,350	1
6	6	4,389	Res	1925	13,500*	1
6	7	14,850	Church	1927	50,000*	1
6	8	6,750	Res	1929	17,800*	2
6	9	20,160	Public	1961	88,290*	2
6	10	9,576	Bus	1963	38,000	2
6	11	4,150	Apts	1899	21,000	3
6	12	5,280	Res	1911	18,950	2
6	13	9,202	Vacant		8,500*	
6	14	6,106	Apts	1923	15,600	3
6	15	13,333	Res	1927	31,500	1

Note: The whole block falls in B3 Business Zone

* This property is tax exempt

1 in square feet

2 in dollars

Supplement to Land Use Data Bank Problem

There are, obviously, many alternative solutions to this design problem. Some of these solutions may be better than others. One alternative is described in this handout.

1.	Block number	allot at least two numeric digits for additional blocks in data bank.
2.	Parcel number	use two digits (numeric) only;(if parcels are designated with a letter suffix, combine than or renumber).
3.	Owner's name	start in column 10 with last name first, followed by initials or first name if there is room.
4.	Street number	three digits; round off half-number addresses. If parcel has more that one number, use the lowest.
5.	Street name	start in column 36; if name is too long, abbreviate or shorten.
6.	Assessed valuation	total of land and building values (source: the third (bottom) number in each parcel on the assessed valuation map; values in dollars, same as on the map).
7.	Land area	in square feet
8.	Land use	Code 1-vacant 2-residential 3-public 4-business 5-industrial
9.	Zoning	Code 1-B1 business 2-B2 business 3-B3 business 4-B4 business 5-R3 residential
10.	Building condition	Code 1-structure with significant deficiencies 2-structure in need of minor repairs 3-structure in need of major repairs

11. Building age Code

1-built prior to 1885 (75+)
2-1885-1910 (50-75)
3-1910-1940 (20-50)
4-1940-196- (0-20)

All numeric information should be right-justified in its field, i.e., pushed to the right-hand edge of the field, with blanks appearing on the left. Alpha/numeric information should be left justified. Special cases may arise, and some convention may have to be adopted; in general, consistency is of prime importance. For example, comparable digits or letters should always appear in the same column, as each character is interpreted on the basis of the column it appears in.

This is one way of formatting the Hollerith card for the above problem on land use:

1	(blank-reserve for card type)		
2		(blank)	
3	block number		property identification
4			
5			
6		(blank)	
7	parcel number		
8			
9		(blank)	
10	owner's name (s)		owner's identification mailing address
30			
31	house number		
32			
33			
34		(blank)	
35	N/E/S/W		
36		(blank)	
37	street name		
49			
50	assessed valuation ($)		value of property
56			
57	land area (sq. ft.)		land information
63			
64		(blank)	
65	land use		
66		(blank)	
67	zoning		
68		(blank)	
69	building condition		building information
70		(blank)	
71	building age		
72		(blank)	
80			

Write and Debug a Pl/C Program That Will Do the Following:

1. Read data about individual parcels of land (i.e., block number; parcel number; frontage, in feet; depth of parcel, in feet).
2. Compute the area (in square feet) of each parcel.
3. Print the block number, parcel number, frontage, depth, and area for each parcel.
4. Compute and print the total area for all the parcels specified. You can assume the following information:
    a. the four input data items for each parcel will be listed in the following sequence from left to right on a punched card: 1-block number; 2-parcel number; 3-frontage; 4-depth. (Data will be separated by blank columns).
    b. a card containing the value 99 for block number will indicate the end of the data.

Please submit a copy of your program listing and its output by______________________.

Housing Analysis Problem

A land use survey has provided the following data for each piece of property in a city:

Block number (e.g., 1, 2, 3, ..., 5000)

Parcel number (e.g., 1, 2, 3, ..., 60)

Value of property (in $1,000)

Zoning specifications
(Class 1 = residential, one or two living units
Class 2 = residential, multiple (2) living units
Class 3 = commercial
Class 4 = light industry
Class 5 = heavy industry)

Land use
(Class 1 = idle
Class 2 = residential
Class 3 = commercial
Class 4 = light industry
Class 5 = heavy industry)

Age of building (in years)

Condition of building
(Class 1 = good
Class 2 = minor repairs needed
Class 3 = major repairs needed, but usable
Class 4 = major repairs needed, but not usable
Class 5 = should be destroyed)

Number of living units in (residential) building
(0, 1, 2, ...)

This information is recorded in the above sequence on punched cards, one card for each parcel. Each peice of data is right-justified in a field five columns wide, as follows (e.g., a $40,000 single-family house built ten years ago on parcel 3 in block 12):

```
   12    3   40   15    1    1   10    1    1
```

The card deck has been stored in a CDS (Card Data Set) named (to be furnished). The first card of the CDS states the number of cards contained in the survey. This figure appears in the first five columns, right justified.

A) One of the uses of this survey data will be to identify (by block and parcel number) any properties that do not conform to their zoning specifications (disregarding building conditions). It is also desired to know the number of such nonconforming properties, and their percentage of the total number of properties.

B) Another use of this survey will be to identify those residential houses in need of major repairs but in usable condition, those houses in need of major repairs but not in usable condition, and those houses which should be torn down. The total property value, land area, and number of living units of each of these three classes of houses should also be determined along with their percentage of the total property value of all houses, total land area, and total number of living units in the city which should be computed from the data.

Write a PL/C program that will do part A above.

Turn in the following items for this problem:

1. A flow chart and the assumptions you made about the problem.
2. A completely debugged PL/C program listing and its output.
3. Brief answers to the following questions:
    a. what other information might you desire if you were directing this study

b. what problems would exist if these land survey became the basis of a new data bank for this city.

4. Part B is available for those of you who find the challenge of programming irresistable.

Income Analysis Problem

Assume you are a planner at HEW. You are given the assignment of processing certain national data to help evaluate possible policy alternatives to equalize income, e.g., tax reductions, minimum income programs, etc.

You take a small sample of all of the data available. The sample is stored in VWM.YPOV and each record in the sample contains the following data items in the listed order:

1. family earned income
2. family size (maximum: 15)
3. family identification number from the larger data base
4. race: 0 = white; 1 = black or other minority
5. region of the country:
    - 0 = northeast
    - 1 = southeast
    - 2 = midwest
    - 3 = southwest
    - 4 = west coast
6. average number of hours worked per week by household head
7. age of household head
8. number of years of school attended by household head

(NOTE: Data items are separated by blanks.)

You would like to determine certain statistics about income levels:

1. the average, median, maximum, and minimum income levels and the family identification numbers of the maximum and minimum income levels for this sample: (The median income indicates that half of the family incomes fall below this value and half above. If the number of records is even, the median is the average of the middle two records.)

2. the median family size

3. % of families in this sample below poverty level

4. average per capita income in each region
   average per capita income in the nation

The data have not been completely verified; there may be errors in the region codes and family sizes. If you find a record with an error, print out the whole record and do not include it in the statistical processing procedure. The error list should be in one group. The data cards are supposed to be in order by ascending income value, but your assistant dropped the deck, so that can't be guaranteed. (Assume there are no more than 100 data cards). The current value for the poverty level is in the above file on a data card which precedes the family income data.

Turn in:

a. flow chart
b. print out of the program listing and labeled answers
c. assumptions and explanation of any additional tests you have made
d. conclusions from your analysis of these data of possible causes of income variation

(If you have a hang-up about deriving social policy from this type of statistical analysis, feel free to show it.)

P.S. This type of assignment asks for a lot of output. A lot of numbers printed out down a page of computer output means little to the person reading it. So please label your output using the computer, not a pencil.

Input-Output Exercise

Write and debug a PL/C program that will read selected information from each record in the property file which you created for the Land-Use Data Bank Problem and print that information in a different format. The printed output should take the following form:

(owner's name (s))
(owner's mailing address)
  Ithaca, New York 14850
(block number) (parcel number) (assessed valuation)

Please submit a copy of your program listing and the output. Save your program cards for the next problem.

Property Taxes Problem

In the Land Use Data Bank Problem, you coded land use information and punched Hollerith cards to establish a data bank covering one block of an urban area. Many cities have data banks of this type. Very often they are only used by the department that created them. Ideally, data banks should serve the needs of many departments in city government. You have also seen in earlier problems how data banks can be used in analysis. This problem is concerned with the use of such a data bank for administrative purposes.

Write a PL/C program that is capable of determining the various taxes that are due on properties contained in the data bank you created in the Land Use Data Bank Problem.

Use the following tax rates:

City tax rate (per $1000 assessed value)	$15.00
State and County tax rate (per $1000 assessed value)	5.31
School tax rate (per $1000 assessed value)	25.00

The output should be in the form of mailable statements of account showing tax rates, assessed value and taxes due.

(name)
(local address)
(city, state, zip code)

(block number) (parcel number) (valuation)

(city tax rate)
(state and county tax rate)
(school tax rate)

(city tax due)
(state and county tax due)
(school tax due)
(total tax due)

After you have listed all of the individual tax bills, skip to the beginning of a new output page and print the following summary statistics for the tax office:

(total # of taxable parcels)
(total # of non-taxable parcels)

(total valuation of taxable parcels)
(total valuation of non-taxable parcels)

(total city tax due)
(total state and county tax due)
(total school tax due)
(total of all taxes due)

Feel free to use appropriate portions of the program you wrote for the last problem in developing this program.

Turn in the following items for this problem:

a. flow chart
b. a completely debugged program listing and its output formatted according to the above specifications.

SPSS Assignment

Draw some conclusions about the income and family data you have analyzed previously (now found in PGF.STAT) by using the SPSS program MARGINALS (or other SPSS programs if you desire). You should probably be able to determine:

1. average family size

2. the family size category most families fall into

3. whether the sample is random, given that the percentage of nonwhites in the population is 10%. There are several factors which ought to be considered here, plus what your intuition tells you the average values ought to be. Whatever you conclude on the randomness of the sample, tell why.

4. the number of hours per week do most people work. (What do you base this figure on?)

5. average age

6. average age of single persons

7. average number of years in school for heads of households with incomes below $10,000.

If for any reason you cannot determine any of these from the program results, explain why.

The data are arranged as follows on the cards:

Each variable value is right-justified in a field 10 columns wide. There are no numbers to the right of the decimal point.

There are 18 cards.

Since the data are on a card file, you will use an INSERT card in the position in the deck where the data cards go.

In addition to these problems, reading assignments on various types of real-world applications can be drawn from the references presented in the student reading list.

METHODS OF EVALUATION

Students should be able to demonstrate that they have mastered the skills presented in class. This can be done by assigning homework problems from the textbook and laboratory problems similar to those presented in the section on instructional strategies. The laboratory problems should be programmed, debugged, and correctly executed on a computer by each student in the class. Similarly, students should have an opportunity to prepare and execute at least one packaged program on statistics (SPSS or some other package) and mapping (SYMAP or some other package) depending upon what is available at their schools computing facility. There should be at least one examination on the classroom material.

AN INSTRUCTIONAL MODULE FOR INFORMAL COMMUNICATION

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Supported by a grant from the National Science Foundation

STATEMENT OF OBJECTIVES

The urban technologist must be able to communicate with a variety of people. The purpose of this instructional module is to provide the prospective technologist with an educational experience that will enhance his ability to communicate. The objectives of this module are:

1. To enable the technologist to communicate and empathize with nonprofessionals
2. To enable the technologist to live and work in the real world with real people

INSTRUCTIONAL OUTLINE

I. General considerations
    A. The problem -- the need for communication among people
        1. among people and groups
        2. between citizens and public officials
        3. between technologists and people
        4. the need for understanding and empathy
    B. What happens when communication is absent or lacking in our society?
        1. misunderstanding
        2. poorly conceived plans
        3. animosity
        4. violence
        5. alienation
    C. What can we do about the problem in order to avoid the consequences?
        1. treat people as human beings with emotions and needs like ours
        2. learn about their problems
        3. try to understand the complexity of the issues
        4. plan with rather than for people
        5. empathize with the people whom we are dealing with

An interesting and readable book illustrating some of the reasons why we fail to understand certain segments of our society is:

> Harrington, Michael, The Other America, (Baltimore: Penguin Books, 1963).

For a famous discussion of basic human needs, consult:

> Maslow, Abraham, Motivation and Personality, (New York: Harper and Row, 1970), Chapters 4 and 5.

II. Communicating with public officials
- A. The American political system
  1. federal-state-local relations
  2. the crucial importance of local officials in the decision-making process
  3. the political party system and its emphasis on localism
  4. interest groups
  5. the place of the individual in the system
- B. The local political system
  1. the city, county, township, district, etc.
  2. the regional planning agency
  3. the variety and power of local, public officials and agencies
     - a. what do all of these people and agencies do
     - b. whom do we contact, and where, when we want results
  4. state and federal officials and agencies in the local area
     - a. what do they do
     - b. how do we contact them
  5. the local bureaucrat
- C. The role and place of the technologist in the complex, local political system
  1. how can he get things accomplished
  2. the importance of knowing how the system works
  3. how to deal with frustration arising from not accomplishing what one wants to accomplish within the system
- D. The community power structure
  1. what is it
  2. the role it plays in the community
  3. who makes the decisions that count in the community

An introduction to the need for public participation and some of the problems associated with it is found in:

Kendrick, Frank, *et al*, *Strategies for Political Participation*, (Cambridge, Massachusetts: Winthrop Publishers, 1974), Chapters 1, 2, 3, and 7.

An excellent analysis of citizen attitudes toward government is:

U.S. Congress, Senate, Subcommittee on Intergovernmental Relations, "Confidence and Concern: Citizens View American Government," (Cleveland: Regal Books/King's Court Communications, 1974). These are the results of a Harris survey of public attitudes toward government which was conducted in 1973.

Other readings dealing with some of the problems of communications between citizens and government are:

Caudill, Harry M., *Night Comes to the Cumberlands*, (Boston, Massachusetts: Little, Brown, and Co., 1963), Chapter 21.

Dye, Thomas R. and Zeigler, L. Harmon, *The Irony of Democracy*, (Belmont, California: Duxbury Press, 1971), Chapters 1, 11, and 13.

Lockard, Duane, *The Perverted Priorities of American Politics*, (New York: The Macmillan Company, 1971), Introduction and Chapter 1.

Students should also be asked to read the charter of the city in which they live or expect to work for the purpose of viewing the formal framework of the government.

Finally, a very good discussion of tactics in dealing with government is found in:

Van Riper, Paul P., *Handbook of Practical Politics*, (Evanston, Illinois: Row, Peterson, and Company, 1960).

III. Communicating with citizen groups
   A. The great variety of groups in the United States
      1. the openness of the American system encourages group activity
      2. the problem of frustration on the part of citizen groups

B. Groups at the local level
   1. the great variety of groups
   2. what groups do
   3. how groups operate
   4. what groups want
   5. attitudes of groups toward the system

C. The relationships between groups and the local political system
   1. methods for coping with citizen interests and demands
      a. the traditional methods of dealing with group demands
      b. newer techniques for dealing with groups
   2. the new emphasis upon citizen participation in planning and policy-making

D. Should the technologist seek out citizen groups, or should he wait for the groups to contact him
   1. the problem of knowing what people want
   2. the problem of knowing what people to contact, and how to contact them
   3. the importance of knowing about community problems

A brief introductory reading is found in Kendrick, Frank, *et al*, Chapter 8. But some of the problems of communicating with particular kinds of citizen groups are discussed in:

Alinsky, Saul D., *Reveille for Radicals*, (New York: Vintage Books, 1969), Chapters 4, 5, 6, 7, and 8.

Gardner, John W., *In Common Cause*, (New York: W.W. Norton and Company, 1972), Chapters 1, 2, 3, 4, 5, 6, and 7.

Parker, Richard, *The Myth of the Middle Class*, (New York: Liveright, 1972), Chapters 1 and 6.

Ryan, William, *Blaming the Victim*, (New York: Pantheon Books, 1971), Chapter 5.

The nominal group method is explained and compared with other methods by:

Van de Ven, Andrew and Delbecq, Andre L., "Nominal vs. Interacting Group Processes for Committee Decision-Making Effectiveness," *Academy of Management Journal*, Volume 14, No. 2, June 1971. If this article cannot be located, there are numerous other explanations of either this method or other small-group methods.

IV. Communicating with minority groups
- A. The kind of minority groups in the community
    - 1. where are they
    - 2. who are they
    - 3. the demographic characteristics of the community
    - 4. population statistics and how to use them
- B. The groups with which the technologist should and must deal in his particular position
- C. Special problems of minority groups
    - 1. discrimination and prejudice
    - 2. exclusion from the system
    - 3. attitudes toward the system and reverse prejudice
    - 4. cultural differences
- D. The interests of minority groups
    - 1. in general
    - 2. in the community
- E. How do we communicate with groups that are hostile, distrustful, or prejudiced toward us

Good introductory readings into minority group problems within the American system are:

Dye, Thomas R., and Zeigler, L. Harmon, The Irony of Democracy, (Belmont, California: Duxbury Press, 1971), Chapter 12.

Handlin, Oscar, The Newcomers, (Garden City, New York: Anchor Books, 1962), Chapters 3, 4, 5, and 6.

Herzog, Stephen J. (ed), Minority Group Politics, A Reader, (Chicago: Holt, Rinehard, and Winston, 1971), Chapters 11 and 12.

Lubell, Samuel, The Hidden Crisis in American Politics, (New York: W.W. Norton and Company, 1971), Chapter 4.

Ryan, William, Blaming the Victim, (New York: Pantheon Books, 1971), Chapters 1, 2, and 3.

Good expresions of minority group frustration and desires are:

Carmichael, Stokely and Hamilton, Charles V., Black Power, (New York: Vintage Books, 1967), Chapters 1, 2, and 3.

Cleaver, Eldridge, Soul on Ice, (New York: Dell Publishing Company, 1968).

Liebow, Elliot, Tally's Corner, (Boston, Massachusetts: Little, Brown, and Company, 1967), Chapters 1 and 7.

V. Communicating with neighborhood residents
  A. The neighborhoods in the community
    1. use of census tracts and block statistics to identify neighborhoods
    2. other methods for identifying neighborhoods
      a. political leaders in the community
      b. citizen groups
      c. city planning departments
  B. Neighborhood groups
    1. improvement associations
    2. community houses or centers
    3. block clubs
    4. others
  C. The activities of neighborhood groups
    1. what they do
    2. how they operate
    3. who belongs to them
    4. attitudes of neighborhood residents toward these groups
  D. Attitudes of neighborhood residents, leaders, and groups toward public officials and government
  E. Relationships between public officials and neighborhood organizations

There are not as many good readings concerning this subject, but there is one that expresses some of the problems of neighborhood organizations:

Ecklein, Joan L. and Lauffer, Arnold, *Community Organizers and Social Planners*, (New York: John Wiley and Sons, 1972), Chapter 6.

Another that touches on the subject is:

Perlman, Robert and Gurin, Arnold, *Community Organization and Social Planning*, (New York: John Wiley and Sons, 1972), Chapters 5 and 6.

Readings that present some of the feelings and perspectives of urban dwellers, as well as some of the problems of urban, neighborhood life are:

Makely, William (ed), *City Life, Writing From Experience*, (New York: St. Martin's Press, 1974), Chapters 1 and 2.

Ryan, William, Blaming the Victim, (New York: Pantheon Books, 1971), Chapter 7.

U.S. Department of Housing and Urban Development, Office of Policy Development and Research, *The Dynamics of Neighborhood Change*, December 1975.

VI. Communicating with people; some concluding observations
   A. General problems
      1. communicating with public officials
      2. communicating with citizen groups
      3. communicating with minority groups
      4. communicating with neighborhood residents
   B. What do these people feel about the world
   C. What are the problems that these groups seem most concerned with
   D. What are their attitudes toward government and toward each other
   E. How do students feel in communicating with these groups
      1. at ease or ill at ease
      2. superior or equal
      3. do students empathize with the people they have met
   F. What has been learned from the previous exercises and class discussions

There is little in the way of reading that seems to belong here, but for a general picture of advocacy planning (into which some of the students may go) and citizen participation, the following articles are suggested:

Breitbart, Myrna, "Advocacy Planning," in Kasperson, Roger E. and Breitbart, Myrna, *Participation, Decentralization, and Advocacy Planning*, (Washington, D.C.: Association of American Geographers, 1974), Resource Paper No. 25, pp. 41-55.

Lind, Alden, "*The Future of Citizen Involvement*," The Futurist, (December, 1975), pp. 316-328.

STUDENT READING LIST

Because this course is geared to actual involvement rather than to lectures and class preparation, a reading list will naturally suggest only a few titles that might help the student to broaden his knowledge about certain issues and problems.

Moreover, because the readings are discussed in more detail in the instructional outline, little need be said here except in regard to selections that do not appear elsewhere.

General Considerations

A useful guide to innovative techniques for teaching about participation in politics is:

Bollens, John C. and Marshall, Dale Rogers, *A Guide to Participation: Field Work, Role Playing Cases, and Other Forms*, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1973). This book could be of particular value to the instructor.

Other recommended books are:

Harrington, Michael, *The Other America,* (Baltimore: Penguin Books, 1963).

Maslow, Abraham, *Motivation and Personality*, (New York: Harper and Row, 1970).

Communicating With Public Officials

Recommended books are:

Caudill, Harry M., *Night Comes to the Cumberlands*, (Boston, Massachusetts: Little, Brown, and Company, 1963).

Dye, Thomas R., and Zeigler, L. Harmon, *The Irony of Democracy*, (Belmont, California: Duxbury Press, 1971).

Gardner, John W., *In Common Cause*, (New York: W.W. Norton, and Company, 1972).

Kendrick, Frank, *et al*, *Strategies for Political Participation*, (Cambridge, Massachusetts: Winthrop Publishers, 1974).

Lockard, Duane, *The Perverted Priorities of American Politics*, (New York: The Macmillan Company, 1971).

Communicating With Citizen Groups

Recommended books are:

Alinsky, Saul D., *Reveille for Radicals*, (New York: Vintage Books, 1969).

Gardner, John W., *In Common Cause*, (New York: W.W. Norton and Company, 1972).

Parker, Richard, *The Myth of the Middle Class*, (New York: Liveright, 1972).

Ryan, William, *Blaming the Victim*, (New York: Pantheon Books, 1971).

Communicating With Minority Groups

Recommended books are:

Carmichael, Stokely and Hamilton, Charles V., *Black Power*, (New York: Vintage Books, 1967).

Handlin, Oscar, *The Newcomers*, (Garden City, New York: Anchor Books, 1962).

Herzog, Stephen J. (ed), *Minority Group Politics, A Reader*, (Chicago: Holt, Tinehart, and Winston, 1971).

Liebow, Elliot, *Tally's Corner*, (Boston, Massachusetts: Little, Brown, and Company, 1967).

Communicating With Neighborhood Residents

Recommended books are:

Ecklein, Joan L. and Lauffer, Arnold, *Community Organizers and Social Planners*, (New York: John Wiley and Sons, 1972).

Makely, William (ed), *City Life, Writing from Experience*, (New York: St. Martin's Press, 1974).

Perlman, Robert and Gurin, Arnold, *Community Organization and Social Planning*, (New York: John Wiley and Sons, 1972). This book is a companion to the Ecklein and Lauffer book.

U.S. Department of Housing and Urban Development, Office of Policy Development and Research, The Dynamics of Neighborhood Change, December 1975. This is an excellent study of neighborhood change in the United States.

Communicating With People; Some Concluding Observations

It would be well to consider again:

Maslow, Abraham, Motivation and Personality, (New York: Harper and Row, 1970).

INSTRUCTIONAL STRATEGIES

The following strategies are offered as suggestions to the instructor, who can select and use them as desired. Also, the list is by no means exhaustive, and the instructor is encouraged to innovate if need be. One objective should always remain paramount, however -- the students should be encouraged to assume most of the initiative in communicating with individuals and groups in the community. The instructor's role is one of introducing certain materials, guiding the students, offering assistance, and stimulating class discussion. It is with these considerations in mind that the following strategies are suggested.

General Considerations

To begin with, a simple encounter group session could be used with the class, provided it is not too large, in order to develop rapport among the students and instructor. There are some simple encounter group routines, similar to "parlor games," that present no traumatic shock to the participants.

The only purpose is to induce communication among all the participants in the class.

Most of the material in this section can be covered by the instructor in one, or possibly two, lecture-discussion sessions. But emphasis should be placed on encouraging as much informal discussion among the participants as possible. Since the overall purpose of this class is to teach students how to communicate with other individuals as human beings, it would seem that the students ought to begin by learning how to communicate freely with each other. Therefore, the instructor should at all times try to avoid appearing "professorial" or too academic.

Communicating with Public Officials

There are at least two objectives to accomplish in this section: First, some brief, but inclusive, description of the American governmental and political system should be made to demonstrate the great complexity and decentralization that are characteristic of the system. Second, the student ought somehow to become aware of the fact that public officials are human beings, who can be dealt with and talked to. A brief, concise, and understandable lecture by someone in the field of American politics and government should be used at the beginning. The students should also be required to attend one or two meetings of local political bodies -- city council, county commission, policy board, or the like-- in order to see what happens in such meetings.

Students might also select certain local, public office holders to interview, on an individual or team basis; or several office holders -- legislators, councilment, department heads, bureaucrats, etc. -- could be invited to the class to discuss their roles, as informally as possible, with the class as a whole.

The most effective technique that could be employed to help students with the problem of how to get things done in a complex system of government is to have the class select a number of outstanding issues that confront the community on a daily basis. Such problems would be specific, individual, neighborhood, or group issues that should be the concern of some public officials or agency, and which could be defined in terms of particular cases. Examples are: a case of housing discrimination, a problem of inadequate sewerage, a neighborhood zoning variance, etc. Then the class would be divided into teams of three or four members to consider individual problems, and ultimately to propose methods for dealing with them. Some research into specific aspects of local government would be required in order to discover how these problems could be dealt with. Visits to public agencies would also be required. Finally, all visits to agencies or to public officials, as well as individual team efforts and problem-solving, are to be reported to the whole class and discussed. Obviously, the class cannot hope to learn everything about the local political system in only a few experiences. But the students ought to come away with at least some appreciation of the great complexity of the American system, even at the local level, and also of the roles that individual officials and agencies play in the system.

As a conclusion to this section, there ought to be some brief consideration of the place of the "establishment," or the community power structure in the system. This latter must be considered as a reality of American government that exists in the most open of American communities. In other words, students ought at least to realize that some important issues are decided behind the scenes, by the influential, and there is not very much that can be done to cope with this situation.

Communicating with Citizen Groups

An opening, brief talk on group activity in the American system would be appropriate purely for purposes of introduction, however, students should be pressed to investigate the community. Specifically, students could be assigned, in teams of three or four, to selected, local citizen organizations in order to discover how the groups operate, what they do, their particular interests, etc. These investigations, which are carried on in the field, would then be summarized and discussed at general class sessions.

Within this section of the course, it would be well to learn something about techniques for conducting citizens' meetings. Simulated meetings, using all members of the class, should be set up. Two techniques might be used: the nominal group, or other small-group, method; and the formal hearing approach. These two techniques offer direct contrasts in approaches to dealing with citizens. Students would assume the roles of citizen group representatives, moderators, small group chairmen, etc. After the meetings, critical discussions among the class members will illuminate the issues and problems.

If there are opportunities for students to attend public citizen participation or citizen group meetings during the time the class is given, students should be encouraged to do so. These meetings can then be described and discussed critically with the class as a whole.

Finally, after communicating with citizen groups in the community, at least some of the students ought to be able to discuss the last question of whether the technologist should seek out citizens' groups, or simply wait for them to call upon him. Depending upon what has been learned about the needs and desires of certain groups, a general class discussion of this question would be a fitting conclusion to this section.

Communicating with Minority Group Members

This may well present the greatest challenge to the students because of the distrust and actual hostility often felt by minority groups in the community. Thus any contacts with minority groups should be made with care, and with as much advance knowledge as possible

The first step is to identify minority groups in the community. This should be done by examining census data in order to discover what some of the groups are, and where they live. There also are probably studies of census data already completed for the community, particularly if it is a large one, which can be located in the public library and consulted. Local political leaders can also be consulted.

The next step is to identify what minority groups are to be contacted. Black residents are probably the most likely to be selected in most communities although there are exceptions. Moreover, in some communities, particular ethnic minorities would play important roles and ought therefore to be considered. An examination of census data should assist in identifying some of the problems of minority groups in the community; problems of segregation, income disparity, and housing.

The last step is to establish communication, a step which is no doubt the most difficult. Here, one would probably work through the local leadership of groups such as N.A.A.C.P., Urban League, ethnic organizations, church groups, etc. The class should again be divided into small teams, each of which is directed to communicate with a particular minority group organization. "Rap" sessions, if possible, should be worked out in which minority group members can talk informally with class members.

In this section, as in others, emphasis should be placed on pressing the students to decide for themselves what groups should be contacted, and then making the actual contacts.

Since communication is the ultimate skill to be learned, the students should be encouraged to demonstrate as much initiative as possible. This section should also be followed by a self-evaluation, discussion session for the whole class.

Communicating with Neighborhood Residents

The first problem here, as with the preceding section, is to identify the neighborhoods to be considered. Census statistics again would provide some of the information, at least as to the particular census tracts which are of interest to technologists. Political leaders, such as ward councilmen and some of the citizen group and minority group leaders previously contacted, should also prove to be helpful here in identifying problem neighborhoods and issues.

Next, a field trip might be arranged to spend a day touring several of the selected neighborhoods. The purpose here is to give the students at least a superficial oversight of the areas in which they might be interested.

The class should then be divided into teams, each of which is assigned a particular neighborhood. If neighborhood organizations exist, the leaders should be contacted for the purpose of interviewing and meeting informally with members of the organizations. If organizations do not exist, communication is obviously difficult. In this case students might work through churches, Model Cities organizations, or the Community Action Program. If, however, no way can be found in the short time devoted to this problem to communicate with residents of particular neighborhoods, then all efforts at communication should be directed only at those areas where contacts can be arranged.

Again, this section should be concluded with a general class discussion of the results of the team efforts, and of the problems of communication with neighborhood residents.

Communicating with People; Some Concluding Observations

The last section, which should cover three or four hours, is designed to encourage candid discussions of what has been acquired from the previous investigations. Therefore, discussion should be centered on communications problems, attitudes of groups and individuals contacted, neighborhood and group problems, attitudes toward public officials, and finally how the students felt in communicating with the groups and individuals contacted.

The class should be divided into small groups of four or five persons each, for purposes of stimulating this discussion. Each group should contain a cross-section of students who contacted different kinds of groups and who had different kinds of experiences. If the class has been involved in numerous discussions before, there should be no difficulty in securing plenty of candor and discussion at this point.

The small groups should be directed to compile two kinds of lists: a list of the outstanding problems of communication with the types of groups contacted, and a list of the problems which the various contacted groups feel are paramount in the community. To facilitate these discussions, the small groups might meet at two different times with a session devoted to each category of problems.

The results of these discussions should be reported by one member of each of the small groups to the class in a concluding, general session. Here, the results should be recorded on flip charts, or a blackboard, for all to see and to comment upon. The instructor might offer a final, subjective evaluation of what has happened during the course of the class sessions and investigations. This final talk could be given in the form of a "few parting words of advice," or the like.

METHODS OF EVALUATION

There is no kind of examination or term paper that can provide much of a basis for evaluation of a student's progress in a course of this type. However, the discussions of the last section of the course should offer the instructor who has watched his students progress for ten weeks a relatively good measure of what has been accomplished. Moreover, the discussions of the preceding sections of the course should also provide the observant instructor with a fair impression of what each of the students has learned.

Naturally, the successful use of the previously described techniques requires that the class be relatively small, probably not more than twenty or twenty-five students. In this kind of environment, it should be possible for an instructor to observe his students closely. Indeed, if the instructor has not gained at least a fairly good idea of the competence of all his students after going through the exercises and investigations of the preceding ten weeks, he has not been very observant. Other than close observation on a continuing basis, there are no special evaluation techniques appropriate for this kind of course.

AN INSTRUCTIONAL MODULE FOR MAPPING AND GRAPHICS

Thomas L. Nash
The University of Akron

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

MODULE NO. 1

Supported by a grant from the National Science Foundation

STATEMENT OF OBJECTIVES

The urban technologist should be able to produce line drawings, maps, charts, and graphs that are commonly used by governmental planning and public works agencies. Specifically, the technologist should be able to produce quantitative isoline and choropleth maps; and qualitative thematic maps to be used in land capability and land use analysis. In order to achieve these objectives, this paper suggests a laboratory course covering the use of cartographic principles and techniques as well as other forms of graphic representation as a means of recording and presenting pertinent urban planning information. Emphasis is placed on cartographic design, relative production costs, multiple use of the graphic products and the use of cartographic tools and equipment.

INSTRUCTIONAL OUTLINE

I. Introduction -- Getting under way
    A. Physical arrangements for laboratory work in the course and needed equipment
    B. Meaning of cartography
        1. relationship to various fields of study and information significant to urban planning and public works (e.g., demography, soil science, geology, engineering, etc.)
        2. types of maps and their appropriate uses
        3. the role of drafting -- how important?
    C. Charting techniques
        1. line, column, bar charts
        2. surface charts
        3. cheating by charting or graphing

D. Reproduction of graphics, black and white, color, using visuals at meetings and in reports, newsletters, etc.

The best coverage of these topics:

Raisz, Erwin, *Principles of Cartography*, (New York: McGraw-Hill Book Company, 1962), Chapter 1, "Tools and Equipment"; Chapter 3, "The Principles of Map Making"; Chapter 9, "Government Maps"; Chapter 27, "Modern Techniques."

This book also includes a glossary of mapping and charting terms which will prove useful to the beginning student.

Other useful sources on these topics include:

Spear, Mary Eleanor, *Practical Charting Techniques*, (New York: McGraw-Hill Book Company, 1969), pp. 1-18.

U.S. Geological Survey, "Topographic Maps Tools for Planning," U.S. Government Printing Office Number 2401-2047.

Leverenz, Jon M. "The Private Cartographic Industry in the United States, Its Staff and Educational Requirements" *The American Cartographer*, Volume 1, Number 2, October 1974, pp. 117-124.

Career World, January 1976. Article on cartography and principal career possibilities.

II. Instruments, materials and techniques
  A. Drawing guides and instruments
    1. T-square, triangles, protractor, compass dividers, bow instruments, curves
    2. ruling pens, quill pens, scribers, inks, drawing tables, drawing boards, grid line coverings, tracing papers, plastic media, shading materials
    3. measuring equipment, drafting and map scales, scale changers, pantograph, planimeter, map-chart projectors
  B. Instruments and techniques for lettering
    1. lettering guides (e.g., Wrico, Leroy)
    2. stick-on lettering
    3. pressure-sensitive lettering sheets
    4. photographic methods (e.g., Varityper, Headliner)
    5. advantages and disadvantages of each technique

C. Drafting procedures -- using the instruments
  1. demonstrations by cartographer
  2. practice makes perfect (pencil and pen) laboratory sessions with materials provided

The best coverage of these topics:

Monkhouse and Wilkinson, Maps and Diagrams, (London: Methuen & Co., Ltd., 1971), pp. 1-85.

Bureau of Naval Personal, Draftsman 3 (Naval Training Course Manual NAVPERS 10471) pp. 1-88 (very good for mechanics of ink drafting).

Keates, J.S., Cartographic Design and Production, (London: Longman Group Limited, 1973), pp. 151-177; pp. 195-218.

III. Lettering -- An art in itself
  A. Importance of lettering: its role of a symbol
    1. principles of varying lettering to differentiate features
    2. elements to be considered in planning lettering
  B. Variation of lettering form
    1. style variation, spacing, centering
    2. size variation, shapes
  C. Variation of color or tone of lettering
  D. Economic and time costs associated with lettering

The best description of lettering can be found in:

Imhof, Edward, "Positioning Names on Maps," The American Cartographer, Volume 2, Number 2, October 1975. American Congress on Surveying and Mapping.

IV. Map compilation and generalization
  A. Base data and base maps
    1. relationship and generalization to map scale
    2. form of visualization and contrast
  B. Simplification and amplification
    1. determine what is significant for graphic communication for the problem at hand
    2. traditional symbolization/standards

V. Symbolization
  A. Significance of symbolization as graphic expression
  B. Kinds of symbols on maps and graphs
    1. qualitative and quantitative
    2. line, point, area, and volume symbols
  C. The use of color in symbolization

The best coverage of these topics:

Robinson and Sale, *Elements of Cartography*, (New York: John Wiley & Sons, Inc., 1969), pp. 39-170.

Branch, Melville, *City Planning and Aerial Information*, (Cambridge, Massachusetts: Harvard University Press, 1971), pp. 89-102.

VI. Map and chart design and format
  A. Balance in layout
  B. Content of marginal information (within the neat line)
    1. necessity for geographic grid or coordinate
    2. scale symbol, design, placement, and necessity
    3. composition and placement of legend
    4. source notes -- wording and necessity
    5. use of directional arrow
    6. design and wording of title
  C. Layout of map/chart elements
    1. the need for balance and compactness
    2. methods of arranging title, scale, legend (component parts of graphic)
  D. Reprographic techniques and printing processes
    1. relationship of reprographic techniques to other phases of graphic construction
    2. types of reprographic techniques -- including halftones and manipulation of line copy negatives as a component of construction
    3. types of revisions to accomodate change

The best source of information concerning these topics:

Keates, J.S., *Cartographic Design and Production*, (London: Longman Group Limited, 1973), pp. 1-33; pp. 87-137.

Robinson and Sale, *Elements of Cartography*, (New York: John Wiley & Sons, Inc., 1969), pp. 249-272.

VII. Introduction to thematic and quantitative symbolization
  A. General types of quantitative symbols using both maps and charts
    1. proportional symbols
    2. dot mapping
    3. flow lines

B. Isarithm maps
   1. inferring the statistical surface
   2. location of base or control points
   3. gradient and interpolation considerations
   4. common errors and problems, especially the number of data points and the quality of data

C. Choropleth
   1. statistics associated with enumeration districts (e.g., townships, cities, villages, census tracts)
   2. absolute data maps (e.g., persons, automobiles, farms)
   3. comparison of ratios involving the observation unit area (e.g., density, percentages, proportions)
   4. common errors and misuse of method

D. Selection of class intervals for quantitative maps maps and diagrams.

The best material pertaining to these topics is found in:

Robinson and Sale, *Elements of Cartography*, (New York: John Wiley & Sons, Inc., 1969), pp. 115-170.

VIII. Land Capability Mapping

A. Approach to land capability mapping
   1. interaction matrix between physical land conditions and proposed land uses
   2. identification of relationships
   3. weighting the relationships in terms of magnitude and/or importance

B. Operation of the matrix analysis
   1. columns and rows of those things which are active and those which are acted upon
   2. quantitation of matrix and production of values for mapping or charting

C. Choropleth and/or Isopleth mapping of the most limiting elements, the magnitude of interaction, and degree of importance

The best sources of information available are:

Luna, Clarke, Hanshaw, and Balsley, *A Procedure for Evaluating Environmental Impact*, Geological Survey Circular 645. U.S. Geological Survey, 1972.

Hills, G.A., *The Ecological Basis for Land-use Planning*, Ontario Department of Lands and Forests, Research Report No. 46, 1961.

Mitchell, Cobin, *Terrain Evaluation*, (London: Longman Group Limited, 1973), pp. 64-115.

IX. Land use map preparation
  - A. Land use maps -- classification for a range of planning scales i.e., individual parcels of real estate to metropolitan or regional levels
  - B. Typical land uses
    1. residential (single family to multiple dwellings, boarding houses, tourist homes, trailer courts, hotels, motels
    2. business, commercial, and industrial uses
    3. public and quasi-public uses
    4. recreation uses
    5. open land uses
    6. vacant land and structures
    7. special cases, dumps, mines, etc.
  - C. Drafting techniques -- general procedures
    1. methods of applying symbols and color in mapping land uses
    2. single use in a parcel
    3. split use in a parcel
    4. open land uses
    5. reproduction considerations
  - D. Data sources
    1. aerial photographs
    2. field surveys
    3. older land use maps

The best sources of information for drafting land use maps can be found in:

> Wilkens, E.B., Mapping for Planning: A Procedural Guide for the Classification and Mapping of Land Uses and Related Technical Studies. American Society of Planning Officials.

STUDENT READING LIST

The best sources for students dealing with sections I through VII in the Instructional Outline are found in:

> Monkhouse and Wilkinson, Maps and Diagrams, (London: Methuen & Co., Ltd., 1971). Especially Chapters 1, 5, and the Appendix.
>
> Raisz, Erwin, Principles of Cartography, (New York: McGraw-Hill Book Company, 1962).
>
> Robinson and Sale, Elements of Cartography, (New York: John Wiley & Sons, Inc., 1969). Especially Chapters 3, 4, 5, 6, 7, 11, 12, 13, and 14.

Spear, Mary Eleanor, *Practical Charting Techniques*, (New York: McGraw-Hill Book Company, 1969). Especially Chapters 1, 2, and 9.

A somewhat more rigorous treatment of these topics is presented in:

Branch, Melville C., *City Planning and Aerial Information*, (Cambridge, Massachusetts: Harvard University Press, 1971). Especially Chapters 3, 4, and 5.

Keates, J.S., *Cartographic Design and Production*, (London: Longman Group Limited, 1973). Especially Chapters 1, 2, 3, 7, 8, 10, 11, 13, 17, 18, and 24.

The best sources for students dealing with sections VII through IX are found in:

Morrison, Joel L., "Changing Philosophical-Technical Aspects of Thematic Cartography" *The American Cartographer*, Volume 1, Number 1, April 1974, pp. 5-14.

Muehrcke, Phillip, *Thematic Cartography*, Commission on College Geography, Resource Paper No. 19, (Washington, D.C.: Association of American Geographers, 1972).

INSTRUCTIONAL STRATEGIES

Introduction -- Mapping and Graphics (this section relates to sections I and II in the instructional outline)

The best approach for the introductory topics in cartographic and graphic representation is a combination mini-lecture, demonstration and skill practicing. Good and bad examples of maps, charts, and diagrams used in planning and public works agencies are shown to the students. (see Exhibit A) Discussion revolves around what the map readers see and probably what the cartographer wanted the readers to see.

Questions to be considered include:

1. Why are there good and bad products produced by the various agencies?
2. Does each graphic use the best technique or process available? (see Exhibit B) What are the relative costs of each technique and process?

Student Activity: Each student will develop a notebook indicating the best possible technique, process, etc., for each type of map or chart which needed. This notebook should be kept current throughout the entire course and will prove useful in other courses and on-the-job situations.

Mapping and Graphics, Lettering, Base Map Compilation, Symbolization, Map Design

The best approach for the development of mapping and graphic techniques is the actual production of art work. This can entail three practical exercises, each of which constitutes the development and construction of a map or chart. The exercises have as their objectives the development of skills listed in sections III, IV, V, and VI of the instructional outline. Each exercise is a separate activity but it must be designed as an input into the following activity. The level of complexity in design and compilation is increased with each step.

Exercise I. Pencil and ink drafting -- generalization of large amounts of data, planning for 2:1 photogtaphic reproduction, lettering design and placement.

Exercise II. Pencil and ink drafting -- must involve one of the following activities:

1. generalization of contours
2. generalization of settlement patterns

3. design of line and area symbols

In addition, the exercise will require lettering design and placement, title and legend composition, and layout of format.

Exercise III. Pencil compilation from multiple sources; design of combined point, line and area symbols; design and placement of lettering; and planning for final inking and photographic process.

Mapping and Graphics, Quantitative Symbolization

Isopleth mapping exercise. Includes experience in compilation of data (both for continuous and discontinuous distributions), processing of data into mapping units, selection of base map, interpolation of isopleths, and planning for 2:1 standard offset reproduction.

Choropleth mapping exercise. Map of a quantitative phenomenon in which choice of data, symbolization, study area, and all other pertinent decisions regarding cartographic design and map construction are left to the initiative and interest of the individual student. Student must also present rationale for using choropleth method with regards to the choice of the phenomenon being mapped.

Mapping and Graphics, Land Capability Mapping

This activity stresses a graphic input for urban/environmental planning studies. The activity relates how an environmental baseline evaluation can use maps and graphics to indicate relationships whether critical or slight, both potential and actual, either benefit, neutral, or detrimental, in a form that can be used in the planning and decision making process.

Working as a group the class focuses on a current or recent suggested urban development proposal order to produce an interaction relationship matrix. The group categorizes various elements to be considered and mapped. Some of the general headings used with the matrix would be water, flora, fauna, geo-physical, natural occurrences, ambience, and man-made elements (see Exhibit C).

Layout of the matrix, including choice of symbolization, is determined. Problems of assembling data are discussed, e.g., different scale maps, different dates, missing data.

Mapping and Graphics, Land Use Mapping

This activity stresses the cartographic problems associated with the actual construction of a land use map rather than procedures for the land use analysis aspects of such a map. The class will have a field trip to a planning agency which produces land use maps. The thrust of the agency's presentations will deal with: 1) drafting techniques and, 2) photographic reproduction of land use maps.

It will be pointed out where several planning and public works agencies are working together in a region where problems and technical studies often coincide, the advantages of uniformity in the use of standardized drafting and mapping techniques are essential.

Reproduction of land use maps using the full range of colors used on manuscript maps is grossly expensive if publication of the studies is contemplated. By combining related land uses into one mapping category, the number of individual indications can be reduced and appropriate black and white hatching can be substituted without loss of detail. In addition, discussion will concern itself with the special problems of using the original land use at scale for the diazotype process as well as for greater than normal amounts of photographic reduction for offset printing.

This field trip and discussion takes place later in the sessions of the course after the students are familar with cartographic instruments, media, and techniques. There will be a critique of the field experience given by the students at the next class meeting.

METHODS OF EVALUATION

The true test as to whether or not a student is gaining skills in mapping and graphics is the accuracy and quality of the products he produces. During the course the student must produce a series of maps and charts (see Exhibit D). The first few products are not graded but are reviewed and commented on by the instructor (and others if available, e.g., staff cartographer, cartographic graduate assistant). Usually the art work is tested by the actual photographing and reduction -- if line work, lettering, symbols, etc., holds and is readable it can be considered the individual is gaining an understanding of the cartographic process. Further progress can be noticed with improvements in design, format, and economic use of materials and time.

During the course the student is to develop a permanent notebook which can become a cartographic reference manual for use in a job situation. It is suggested to the student that the notes be divided into the following sections:

1) drafting hints, useful calculations
2) sources of data and maps
3) relative costs of materials and techniques
4) examples of good and bad maps, charts, graphs, etc.
5) rationale for using various mapping techniques
6) photographic reduction considerations

Of course, the better student will add additional useful information perhaps ideas concerning automated computer cartography. The notebooks are collected by the instructor, reviewed, commented on, and returned to the student.

Finally, it is possible to test for the understanding of cartographic principles and techniques by asking questions, e.g.:

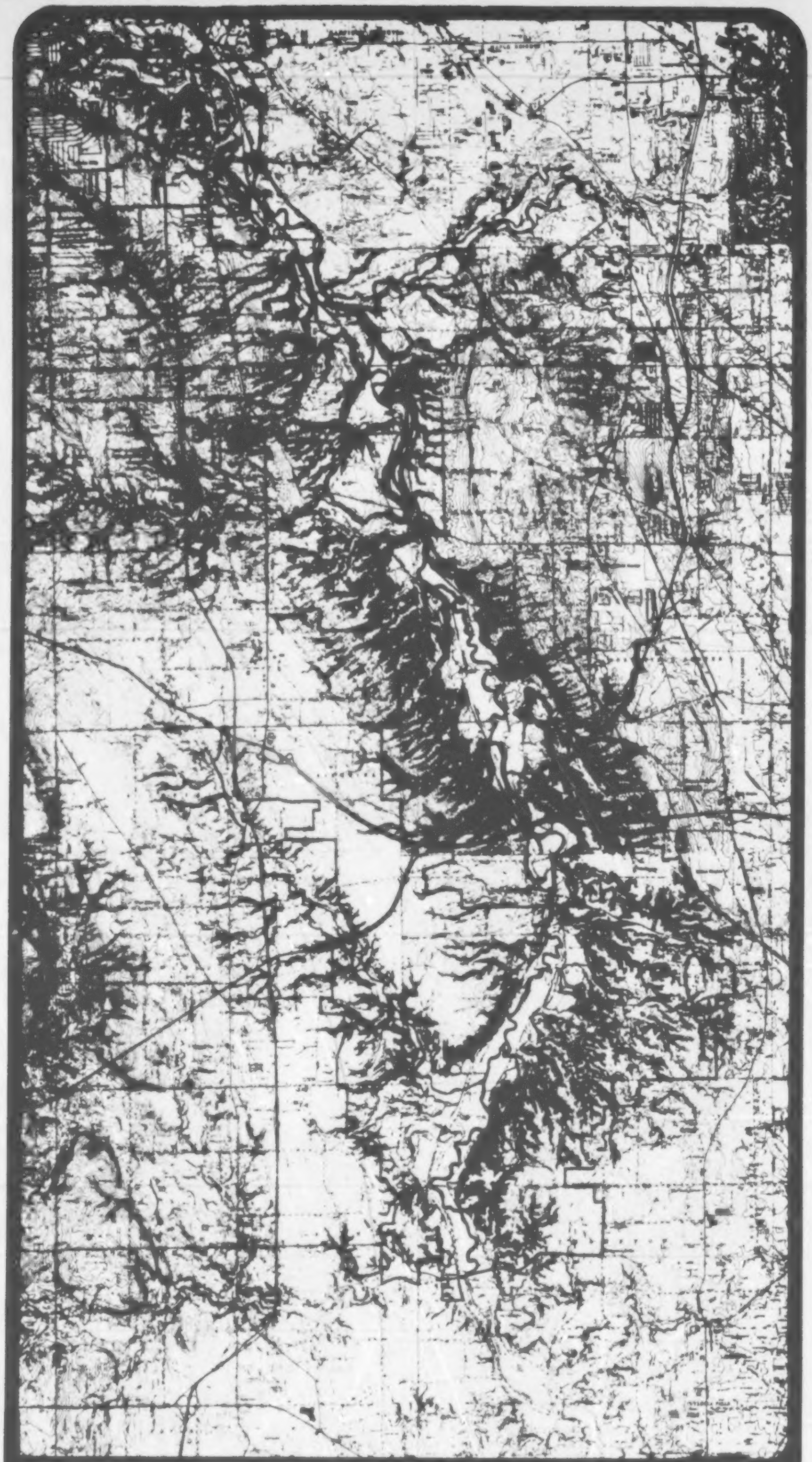
1) how should one map certain kinds of data?

2) how can you change the scale of a base map without the aid of a photographic process?

3) what is the difference between a continuous and a discontinuous distribution?

4) discuss the suitability of the choropleth technique under conditions of widely varying size of a given level of statistical observation unit.

The students can be shown various published maps and asked to make comments regarding proper graphic communication.



CUYAHOGA VALLEY NATIONAL RECREATION AREA 1976 NEFCO

TITLE BLOCK

room for legend material

EXHIBIT A

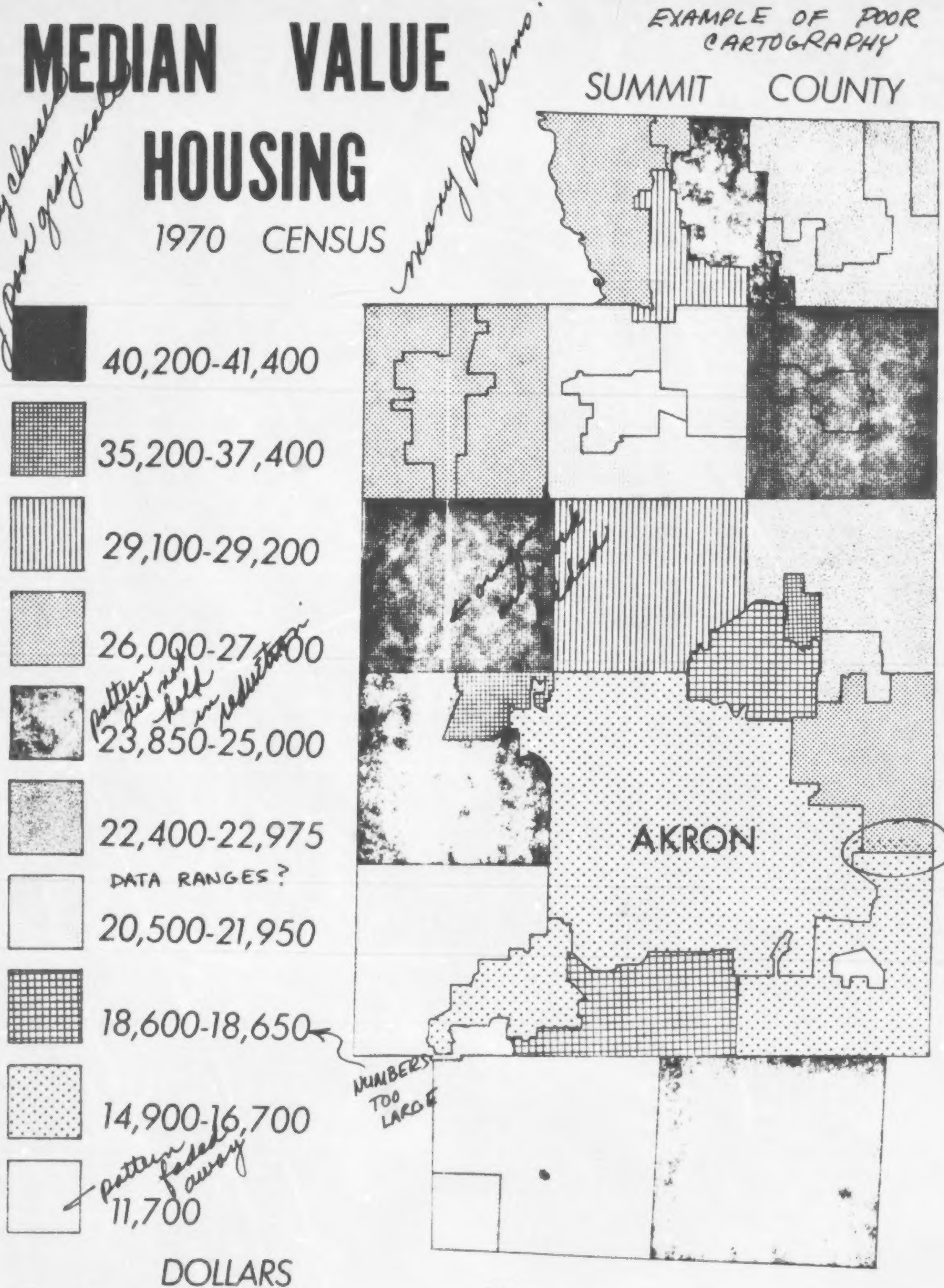
EXAMPLE OF
PLANNING BASE MAP

Exhibit A

EXAMPLE OF POOR CARTOGRAPHY

MEDIAN VALUE HOUSING

1970 CENSUS



SUMMIT COUNTY
AKRON
40,200-41,400
35,200-37,400
29,100-29,200
26,000-27,100
23,850-25,000
22,400-22,975
20,500-21,950
18,600-18,650
14,900-16,700
11,700
DOLLARS

Too many classes very poor grey scale

many problems!!

show to students early in course

discuss mistakes & problems

confusing [illegible]

pattern did not hold in reduction

DATA RANGES?

ZIP-A-TONE NOT CUT PROPERLY

NUMBERS TOO LARGE

pattern faded away

SCALE OF MAP?

SOURCE REMOVED IN ORDER TO PROTECT AGENCY!

Exhibit B

NOTEBOOK MATERIAL

Name of Process: DIAZOTYPE PROCESS AND DIAZOTYPE INTERMEDIATE; Blue, black, red, or sepia lines on several grades of white paper, colored paper, film, cloth, or plastic coated paper

Process: Light sensitive diazo (organic) compounds form dyestuffs in conjunction with couplers (organic reagents). Under exposure to ultra-violet light and development in amonia vapors (Ozalid* or Vapo*) or liquid amonia (Copyflex*) the image becomes visible.
Diazos (whiteprints) can be used in a full range of applications and can produce rough reproductions, transparencies, intermediates, and finished copies in a variety of colors, modes, and finishes.

Recommended for:

1. use in direct sunlight
2. use in making revisions
3. use as teaching aids or visuals
4. use in geographic field work
5. use under dirty conditions

Not Recommended for:

1. use in poorly ventilated areas -- strong odor and harmful to eyes
2. some modes have poor scale stability

Features:

1. can hold up to hard use
2. requires little area for operation
3. easy to set up and use
4. clean in use
5. flexibility of application
6. resists fading
7. corrections can be made on copies

Characteristics:

1. process: wet or dry, darkroom not needed
2. size: 54" by any length
3. base: various grades of paper, including plastic coated; mylar; film; or cloth - all of the above in differing colors of base and line in combination
4. scale: papers - poor; cloth - fair; mylar and film - extremely good
5. image life: permanent
6. exposure: contact from translucent original
7. base selection: determined by specific need

Comments:

This is the most flexible of all systems, able to yield many forms of copy in many arrays, many with all features desirable in a copy

Name of Process:

LITHOPRINT (lithography)
Offset lithoprint

Process:

A process camera that photographs the original to produce a photolithographic negative. The translucent image from the negative is transferred to a sensitized very flexible metal printing plate by light exposure. The images on the plate is offset by a rubber blanketed cylinder to the stock or paper.

Recommended use for:

1. printing for large quantities of work
2. efficient for jobs and commerical industries
3. cost is reduced if job is large

Not recommended for:

1. perferation on stock
2. continuous numbers without changing plate
3. small runs (cost)

Features:

1. high speed continuous action
2. can use different colors for print

Characteristics:

1. process: ink image from offset to stock
2. size: 8½ x 11 to your specification
3. lithographic plates
   a. albumin
   b. presensitized
   c. wipe-on
   d. bimetallic
   e. deep-etch
   f. direct image
   g. electrostatic
4. base: paper must require certain acid and moisture content
5. scale: (dimensional stability): fair to good
6. life image: permanent
7. inks must be formulated for permanent coexistence with moisture
8. plates are dampened at every printing cycle

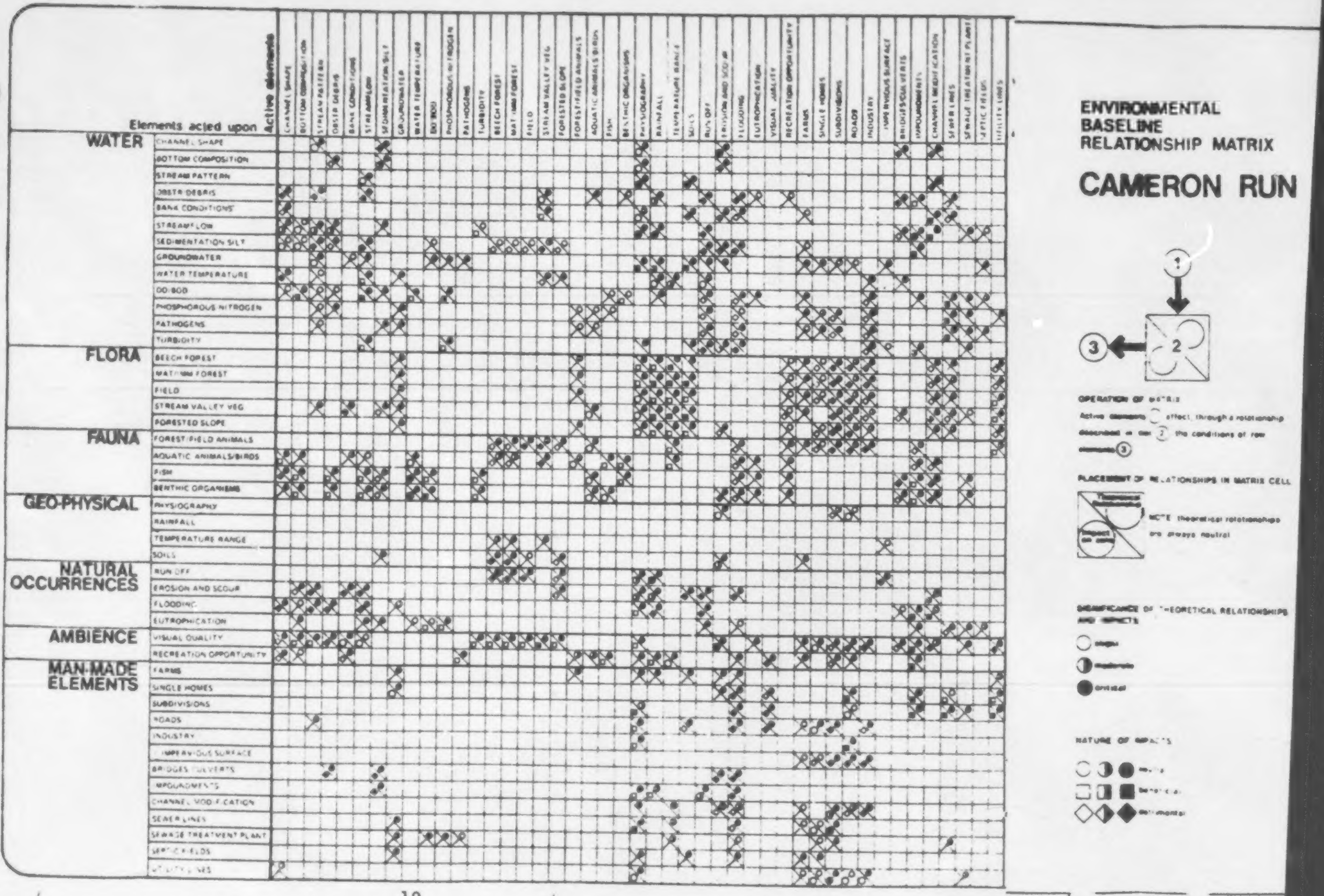
Comments:

When a high degree of transparency is involved lithographic offset method is very capable of handling excellent results.

Exhibit C

ENVIRONMENTAL BASELINE RELATIONSHIP MATRIX

CAMERON RUN


Elements acted upon
Active elements
CHANNEL SHAPE
BOTTOM COMPOSITION
STREAM PATTERN
DEBRIS
BANK CONDITIONS
STREAMFLOW
SEDIMENTATION SILT
GROUNDWATER
WATER TEMPERATURE
DO/BOD
PHOSPHOROUS NITROGEN
PATHOGENS
TURBIDITY
BEECH FOREST
MATURING FOREST
FIELD
STREAM VALLEY VEG
FORESTED SLOPE
FOREST/FIELD ANIMALS
AQUATIC ANIMALS/BIRDS
FISH
BENTHIC ORGANISMS
PHYSIOGRAPHY
RAINFALL
TEMPERATURE RANGE
SOILS
RUN OFF
EROSION AND SCOUR
FLOODING
EUTROPHICATION
VISUAL QUALITY
RECREATION OPPORTUNITY
FARMS
SINGLE HOMES
SUBDIVISIONS
ROADS
INDUSTRY
IMPERVIOUS SURFACE
BRIDGES/CULVERTS
IMPOUNDMENTS
CHANNEL MODIFICATION
SEWER LINES
SEWAGE TREATMENT PLANT
SEPTIC FIELDS
UTILITY LINES
WATER
FLORA
FAUNA
GEO-PHYSICAL
NATURAL OCCURRENCES
AMBIENCE
MAN-MADE ELEMENTS
1
2
3
OPERATION OF MATRIX
Active elements ① affect, through a relationship described in cell ② the conditions of row elements ③
PLACEMENT OF RELATIONSHIPS IN MATRIX CELL
Theoretical Relationship
Impact on cell
NOTE theoretical relationships are always neutral
SIGNIFICANCE OF THEORETICAL RELATIONSHIPS AND IMPACTS
slight
moderate
critical
NATURE OF IMPACTS
neutral
beneficial
detrimental

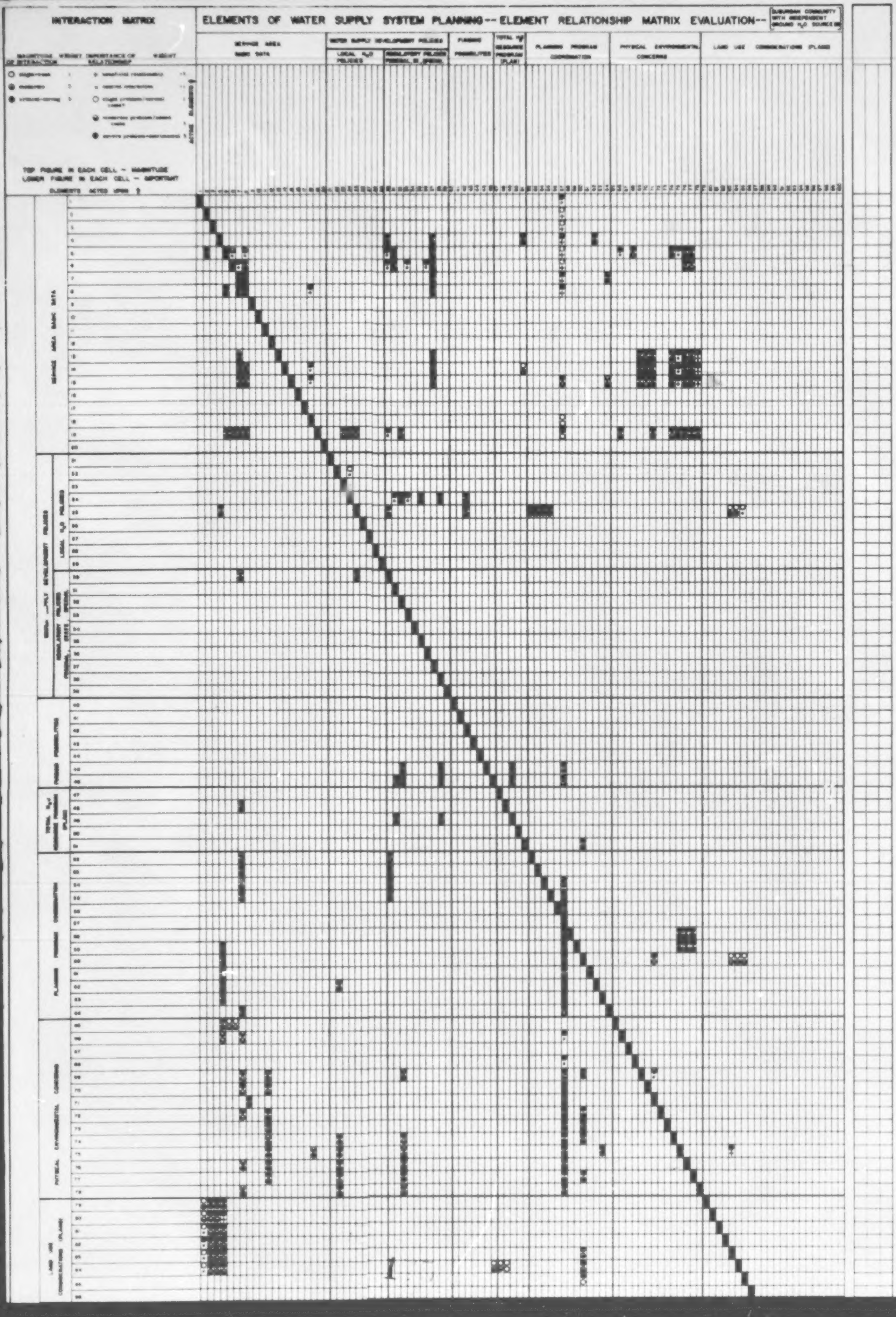
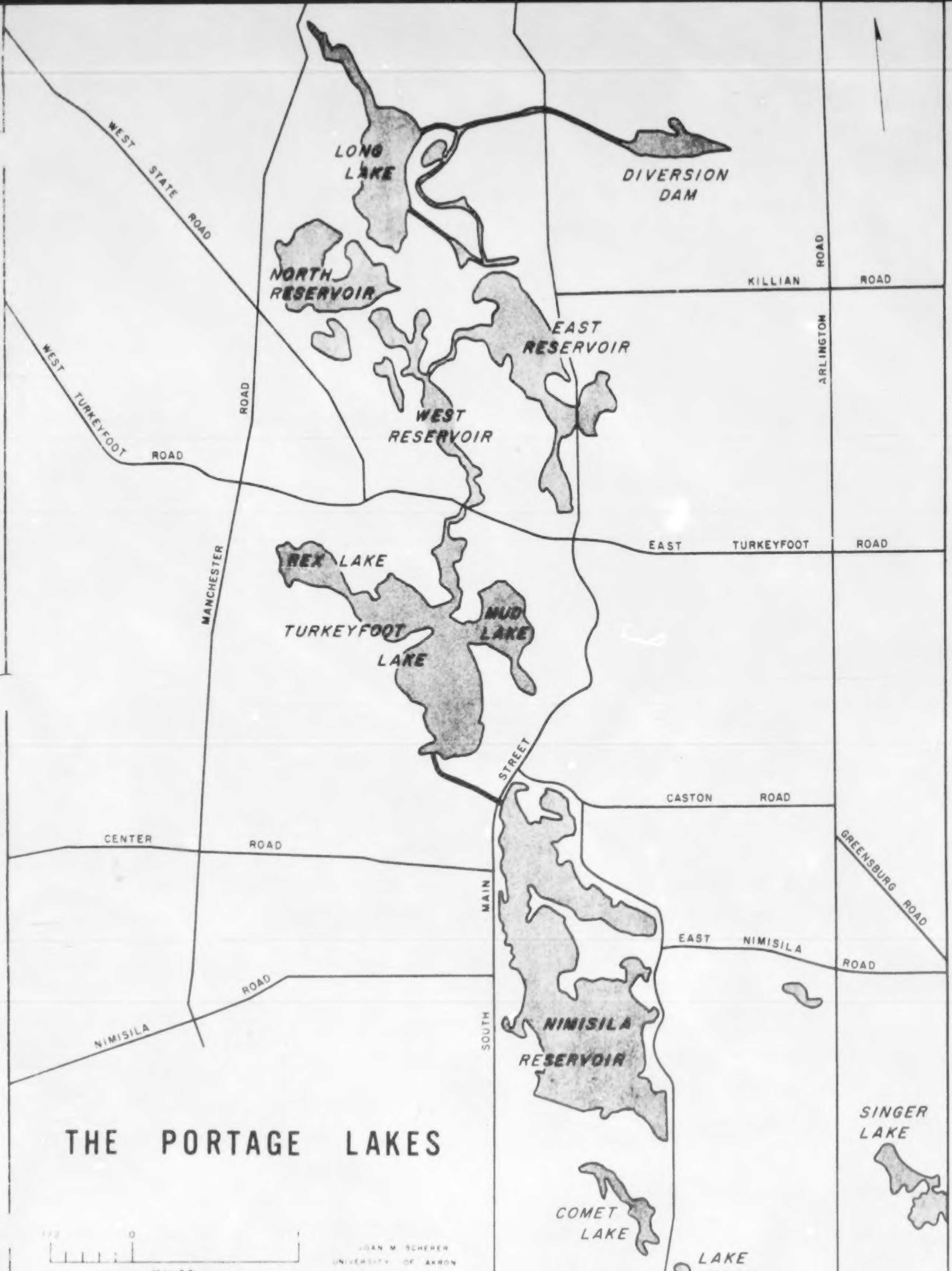

INTERACTION MATRIX
ELEMENTS OF WATER SUPPLY SYSTEM PLANNING -- ELEMENT RELATIONSHIP MATRIX EVALUATION --
SUBURBAN COMMUNITY WITH INDEPENDENT GROUND H2O SOURCE(S)
SERVICE AREA BASIC DATA
WATER SUPPLY DEVELOPMENT POLICIES
LOCAL H2O POLICIES
FUNDING POSSIBILITIES
TOTAL H2O RESOURCE PROGRAM (PLAN)
PLANNING PROGRAM COORDINATION
PHYSICAL ENVIRONMENTAL CONCERNS
LAND USE CONSIDERATIONS (PLANS)
TOP FIGURE IN EACH CELL – MAGNITUDE
LOWER FIGURE IN EACH CELL – IMPORTANT
ELEMENTS ACTED UPON
ACTIVE ELEMENTS

Exhibit C, Cont'd


LONG LAKE
DIVERSION DAM
WEST STATE ROAD
NORTH RESERVOIR
EAST RESERVOIR
WEST RESERVOIR
WEST TURKEYFOOT ROAD
MANCHESTER ROAD
KILLIAN ROAD
ARLINGTON ROAD
EAST TURKEYFOOT ROAD
REX LAKE
MUD LAKE
TURKEYFOOT LAKE
SOUTH MAIN STREET
CASTON ROAD
CENTER ROAD
GREENSBURG ROAD
EAST NIMISILA ROAD
NIMISILA ROAD
NIMISILA RESERVOIR
SINGER LAKE
COMET LAKE
LAKE NOAH
1/2
0
1
MILES

THE PORTAGE LAKES

JOAN M. SCHERER
UNIVERSITY OF AKRON
APRIL 10, 1974

good job!

offset copy - tell printer to center the drawing on the

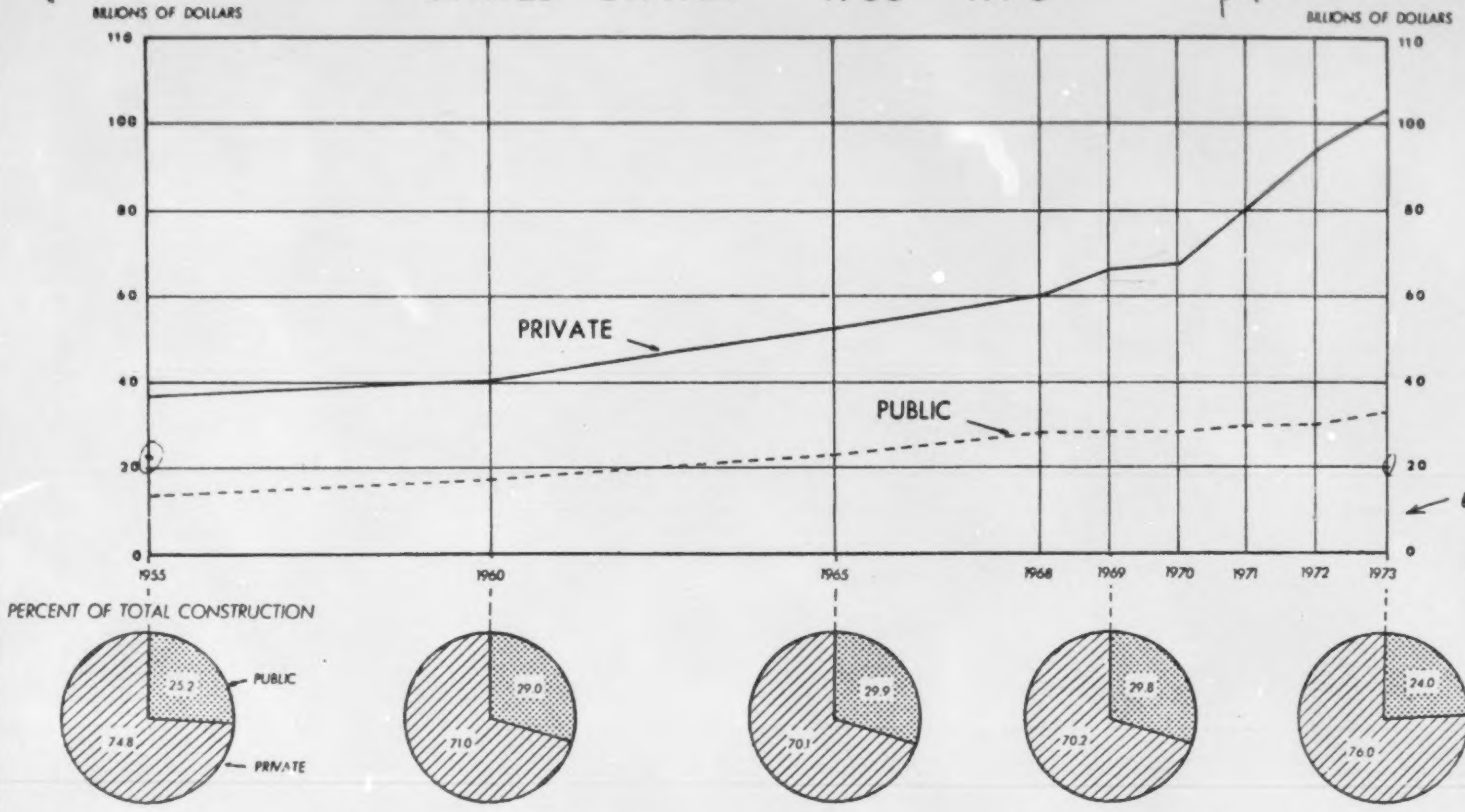
Ind. Student Project

22

EXHIBIT D

VALUE OF NEW CONSTRUCTION
UNITED STATES 1955 - 1973

pay attention to small drafting detail - cleaning drawing before copying work



could use shading on chart

DENNIS DeHOFF
UNIVERSITY OF AKRON
JUNE 1976

SOURCE : U.S. BUREAU OF THE CENSUS

nicely done - I like the layout

xerox copy of one

plate line

AN INSTRUCTIONAL MODULE FOR PLANNING LAW
MACRO LEVEL CONTROLS

Joshua I. Schwartz
Cornell University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

The student is to develop an understanding of the American legal system. This includes familiarity both with the legal structure of American government and with the role of the legal system consisting of statutes, cases and regulations, and its actors: legislators, executives, judges and attorneys, in that system of government. The student will also be introduced to the role of the federal government both in shaping state and local planning activities and in its direct capacity. This module will also cover statewide planning law and will provide the student with a working knowledge of legal research techniques.

INSTRUCTIONAL OUTLINE

I. Introduction to the American Legal System
    A. The structure of government
        1. the federal government
            a. theoretically a government of limited delegated powers
            b. has metamorphosed into a true national government

Engdahl, David E., Constitutional Power: Federal and State In a Nutshell, (St. Paul: West Publishing Company, 1974), pp. 1-10; pp. 11-16; pp. 66-70; pp. 85-89; pp. 110-116; pp. 153-154.

Forkosch, Morris D., Constitutional Law, (Mineola: Foundation Press, 1969), pp. 1-2; pp. 15-20; pp. 29; pp. 77-108; pp. 116-129.

Note: Engdahl is written on a somewhat simpler and less legalistic plane than Forkosch. In addition, Engdahl is available in paperback and is more modestly priced.

2. the states
   a. theoretically unlimited governments with plenary powers except as limited by the United States Constitutions and state constitutions
   b. constitutional interpretation, the expansion of the federal government and the fourteenth amendment combine to greatly restrict the power of states

Engdahl, David E., Constitutional Power: Federal and State In a Nutshell, (St. Paul: West Publishing Company, 1974), pp. 260-294; pp. 317-345.

Forkosch, Morris D., Constitutional Law, (Mineola: Foundation Press, 1969), pp. 293-312.

3. local governments; types
   a. general function governments
      1) municipal corporations
      2) quasi-corporations
   b. special function governments

McCarthy, David J., Local Government in a Nutshell, (St. Paul: West Publishing Company, 1975), pp. 7-10; pp. 43-47.

Note: This is the best brief, readily available, treatment of this topic.

   c. Status of local governments
      1) no mention in U.S. Constitution
      2) states free to abolish at will
      3) sole protection is provisions of state constitutions
      4) only have such powers as the states give them

McCarthy, David J., Local Government in a Nutshell, (St. Paul: West Publishing Company, 1975), pp. 1-22; pp. 23-28; pp. 43-47.

Engdahl, David E., Constitutional Power: Federal and State In a Nutshell, (St. Paul: West Publishing Company, 1974), pp. 22-24.

B. The legal system

Note: If the instructor desires a brief introduction to legal history, see:

Kempin, Fredrick G., Historical Introduction to Anglo-American Law in a Nutshell, (St. Paul: West Publishing Company, 1973), pp. 1-109.

This is not essential for the course.

1. judiciary as one of the branches of government; separation of powers
2. the judiciary as the first among equals?
3. the role of the legislature
4. the administrative process
5. the legal profession

Cohen, Morris L., Legal Bibliography Briefed, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 3-7.

Forkosch, Morris D., Constitutional Law, (Mineola: Foundation Press, 1969), pp. 129-178.

Note: Cohen is a fine legal research manual and its use is suggested in the research segment of the module, below. It also has a few fine introductory pages on the legal system which are highly recommended.

II. The Federal Role in Planning
  A. The lack of a direct role
    1. the defeated Jackson bill; what it proposed; even the Jackson bill for "national land use planning" was an indirect measure

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 19-24.

Dolgin, Erica and Guilbert, Thomas (eds), Federal Environmental Law, (St. Paul: Environmental Law Institute and West Publishing Company, 1974), pp. 1448-1460.

Note: Hagman is an excellent and indispensible basic reference for planning law. It provides the mainstay of the module on micro level planning law. Dolgin is a much more specialized set of essays surveying the field of federal environmental law, and includes a useful discussion of national land use planning.

B. The federal role is largely indirect; operating through funding (the carrot) and the threat of direct federal regulation (the stick)
   1. Section 701
   2. model cities
   3. the A-95 process
   4. the advent of revenue sharing brings a diminution of federal leverage

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 19-24.

Listokin, David, Land Use Controls: Present Problems and Future Reform, (Rutgers Center for Urban Policy Research, 1974), pp. 331-365. Provides an excellent overview of this area.

Dolgin, Erica and Guilbert, Thomas (eds), Federal Environmental Law, (St. Paul: Environmental Law Institute and West Publishing Company, 1974), pp. 1438-1448.

on revenue sharing see:

Mandelker, Daniel R., Managing our Urban Environment, 1974 Supplement, (Indianapolis: Bobbs-Merrill Company, 1974), pp. 29-62.

Reagan, Michael, The New Federalism.

on the A-95 process see:

Mogulof, M., "A Look at the A-95 Process," Journal of the American Institute of Planners, November 1971, pp. 418-422.

C. The environmental law input; environmental law as land use planning

Mandelker, Daniel R., Managing our Urban Environment, 1974 Supplement, (Indianapolis: Bobbs-Merrill Company, 1974), pp. 169-183.

Dolgin, Erica and Guilbert, Thomas (eds), Federal Environmental Law, (St. Paul: Environmental Law Institute and West Publishing Company, 1974), pp. 684-687; pp. 1067-1077.

PAGE 7 OF THE MODULE "AN INSTRUCTIONAL MODULE FOR PLANNING LAW MACRO LEVEL CONTROLS" MISSING FROM DOCUMENT PRIOR TO ITS BEING SHIPPED TO EDRS FOR FILMING multi-volume treatise on the subject as well as this fine one volume text.

B. Procedures agencies must follow
  1. rulemaking
  2. adjudication

Gellhorn, Ernest, Administrative Law and Process in a Nutshell, (St. Paul: West Publishing Company, 1972), pp. 121-137; pp. 138-155.

Davis, Kenneth Culp, Administrative Law Text, (St. Paul: West Publishing Company, 1972), pp. 139-156; pp. 157-212.

C. Judicial review

Gellhorn, Ernest, Administrative Law and Process in a Nutshell, (St. Paul: West Publishing Company, 1972), pp. 42-50.

Davis, Kenneth Culp, Administrative Law Text, (St. Paul: West Publishing Company, 1972), pp. 238-240; pp. 394-395; pp. 396-399; pp. 417-418; pp. 440-441; pp. 457-458.

IV. Statewide Planning
  A. Traditional absence of statewide planning or regulation
  B. New directions
    1. statewide zoning, e.g., Vermont and Hawaii
    2. areas of critical statewide concern, e.g., Florida
    3. coastal zones, e.g., California and Maine

General references:

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 33-38.

Mandelker, Daniel R., Managing our Urban Environment, 1974 Supplement, (Indianapolis: Bobbs-Merrill Company, 1974), pp. 247-286.

Williams, Norman, American Planning Law, (Chicago: Callaghan and Company, 1974), Volume 5, pp. 388-415.

References on critical areas:

Mandelker, Daniel R., 41 Journal of the American Institute of Planners 21, 1975; 26 U. Fla. Law Review 858, 1974; 66 State Government 172, Summer 1973.

References on coastal zones:

1 Coastal Zone Management Journal 1, Fall 1973;
1 Coastal Zone Management Journal 109, Fall 1973.

References on state anti-snob zoning laws:

45 State Government 106, Spring 1972;
44 State Government 2, Winter 1971.

V. Legal Research Methods
  A. Types of materials
    1. cases
    2. statutes
    3. administrative regulations and decisions
    4. secondary sources

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 7-9.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 1-8.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, Revised student edition, 1962). pp. 1-10.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundamentals of Legal Research*, (fourth edition; St. Paul: West Publishing Company,1973), pp. 1-8.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 2-10; pp. 15-21.

Rombauer, Marjorie D., *Legal Problem Solving*, (St. Paul: West Publishing Company, 1973), pp. 65-75.

Note: These are alternative references. The merits and features of the various legal research manuals are discussed at the conclusion of this section of the outline. Generally, the various manuals cover identical material and thus the alternative citations are provided solely for the convenience of the instructor.

B. Formulating the issues for research

Roalfe, William R. (ed), How to Find the Law, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 9-21.

Jacobstein, J. Myron and Mersky, Roy M., Pollack's Fundamentals of Legal Research, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 9-12.

Rombauer, Marjorie D., Legal Problem Solving, (St. Paul: West Publishing Company, 1973), pp. 76-88.

C. Explaining the citation system

Bittner, Harry and Price, Miles O., Effective Legal Research, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 365-406. (material dealing with exotic legal materials and foreign sources can be skipped)

Jacobstein, J. Myron and Mersky, Roy M., Pollack's Fundamentals of Legal Research, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 56-57.

A Uniform System of Citation, (Cambridge, Massachusetts: Harvard Law Review Association, 1967).

D. The reported system: cases
1. official and unofficial reporters; existence of parallel citations

Cohen, Morris L., Legal Bibliography Briefed, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 10-13.

Cohen, Morris L., Legal Research in a Nutshell, (St. Paul: West Publishing Company, 1968), pp. 13-17.

2. Introduction; the system of courts, importance of cases

Bittner, Harry and Price, Miles O., Effective Legal Research, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 111-123.

Roalfe, William R. (ed), How to Find the Law, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 63-65.

Jacobstein, J. Myron and Mersky, Roy M., Pollack's Fundamentals of Legal Research, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 13-33.

3. Federal Cases
   a. U.S. Supreme Court

Cohen, Morris L., Legal Research in a Nutshell, (St. Paul: West Publishing Company, 1968), pp. 13-25.

Cohen, Morris L., Legal Bibliography Briefed, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 12-19.

Bittner, Harry and Price, Miles O., Effective Legal Research, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 126-130.

Jacobstein, J. Myron and Mersky, Roy M., Pollack's Fundamentals of Legal Research, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 38-39.

Roalfe, William R. (ed), How to Find the Law, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 74.

4. State Court Cases

Cohen, Morris L., Legal Bibliography Briefed, (Drexel Library Quarterly, Volume 1, Number 2, (April 1965), pp. 20-24.

Cohen, Morris L., Legal Research in a Nutshell, (St. Paul: West Publishing Company, 1968), pp. 27-35.

Bittner, Harry and Price, Miles O., Effective Legal Research, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 134-135.

Jacobstein, J. Myron and Mersky, Roy M., Pollack's Fundamentals of Legal Research, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 60-69.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 66-72.

5. Locating parallel citations

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 24-26.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 35-40.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 156-160.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundamentals of Legal Research*, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 64.

E. How to find cases
   1. digests
   2. citators
   3. encyclopedias

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 27-42.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 41-67.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 181-262.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundamentals of Legal Research*, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 70-131; pp. 281-308.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), 23-62; pp. 215-222.

F. Statutes
   1. slip laws
   2. looseleaf services
   3. session laws
   4. codes
   5. annotated codes

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 43-62.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 68-103.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 19-38; pp. 90-102.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundementals of Legal Research*, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 133-171; pp. 207-219.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 89-94; pp. 107-120; pp. 127-128.

6. research in statutes

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 62-71.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 103-115.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 72-89; pp. 98-102.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundamentals of Legal Research*, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 171-179; pp. 211-221.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 94-107; pp. 120; pp. 121-130.

7. legislative history
   a. the importance and use of legislative history
   b. finding legislative history

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 72-84.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 116-140.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 54-71.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundamentals of Legal Research*, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 180-206; pp. 223-224.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 130-143.

G. Administrative Law
   1. federal register
   2. code of federal regulations
   3. looseleaf services
   4. state administrative materials
   5. reports of administrative decisions

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 85-100.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 141-162; pp. 163-170.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 161-180.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundamentals of Legal Research*, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 238-280.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 161-184.

H. Other Sources

1. restatements

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 115-116.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 194-201.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 268-271.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundamentals of Legal Research*, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 364-377.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 205-209.

2. Periodicals

Cohen, Morris L., *Legal Bibliography Briefed*, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 116-118.

Cohen, Morris L., *Legal Research in a Nutshell*, (St. Paul: West Publishing Company, 1968), pp. 202-205.

Bittner, Harry and Price, Miles O., *Effective Legal Research*, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 272-284.

Jacobstein, J. Myron and Mersky, Roy M., *Pollack's Fundamentals of Legal Research*, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 332-352.

Roalfe, William R. (ed), *How to Find the Law*, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 185-200.

3. Texts and treatises
   a. use of texts and treatises generally

Cohen, Morris L., Legal Bibliography Briefed, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 114-116.

Cohen, Morris L., Legal Research in a Nutshell, (St. Paul: West Publishing Company, 1968), pp. 196-199.

Bittner, Harry and Price, Miles O., Effective Legal Research, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 263-267.

Jacobstein, J. Myron and Mersky, Roy M., Pollack's Fundamentals of Legal Research, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 353-363.

Roalfe, William R. (ed), How to Find the Law, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 201-205.

   b. some treatises of particular interest for planning law:

Antieau, C.J., Municipal Corporation Law, New York: Mathew Bender.

McQuillin, E., Municipal Corporations, Chicago: Callaghan & Company.

Rathkopf, Arden, The Law of Planning and Zoning, New York: Clark Boardman & Company, Third Edition, 174, Fourth Edition, 1975.

Yokley, Zoning Law and Practice.

Williams, Norman, American Planning Law, Chicago: Callaghan & Company, 1974.

Metzenbaum, Law of Zoning.

Nichols, Nichols on Eminent Domain.

Anderson, Robert, American Law of Zoning, New York: Lawyer's Cooperative Publishing Company, 1968.

I. How to write a report of research findings

Bittner, Harry and Price, Miles O., Effective Legal Research, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 418-420.

Roalfe, William R. (ed), How to Find the Law, (sixth edition; St. Paul: West Publishing Company, 1965), pp. 263-278.

Rombauer, Marjorie D., Legal Problem Solving, (St. Paul: West Publishing Company, 1973), pp. 145-162.

Notes on Legal Bibliography Texts

Bittner and Pollack provide the most comprehensive treatment of the subject of legal research. They would be inappropriate as student texts for the urban technology students, but provide basic reference sources for the instructor. Cohen's Legal Bibliography Briefed is a fine shorter treatment of the subject of legal research and would serve admirably as an instructor's manual. Cohen's Legal Research in a Nutshell is a slight revision of his Legal Bibliography Briefed. The text, Legal Research in a Nutshell, provides competent coverage of the essential materials, and is written on a level likely to be comprehensible to the urban technology students. Therefore, I suggest its use as the student text. Moreover, unlike the other legal bibliography manuals, the Nutshell is available in paperback at a relatively modest price. Students should be urged to purchase this text. It is the only item in either module whose purchase is nearly essential.

Roalfe's text, How to Find the Law, is a useful intermediate level approach to legal research which may be of use both to the instructor and to the student who seeks an alternate explanation on any point. Rombauer's Legal Problem Solving is not really a self-sufficient legal research manual, but provides an excellent and original introduction to legal thinking and to the less mechanical aspects of legal research. It is highly recommended for instructors who lack legal training. If time is available, it is suggested that students read the first 162 pages of Rombauer.

The West Publishing Company, the nation's largest publisher of legal books, has, in the past, published its own brief paperback legal research manual under the title "West's Law Finder." This is often made available to law schools in bulk quantities, free of charge, for use in legal research courses. It is suggested that West be contacted regarding the availability of its manual as a supplement to the other materials. The coverage of this manual is however restricted to the publications of the West Company. While West dominates the legal publishing field, it is not alone in that field and therefore, the West manual cannot replace the Nutshell as a student text. West also publishes a paperback called "Sample Pages" which reproduces typical sections of its different research tools. Sample Pages can be useful for classroom teaching of legal research and is available directly from West.

Another possible source to be utilized for teaching legal research techniques might be the instructional materials used in commercial para-legal training programs. This material has not been included in the outline because I am uncertain whether these courses use generally available texts, such as those cited above, or their own materials. Moreover, if special materials are used it is not certain whether the para-legal institutes would permit their use in the Urban Technologist Development Program. However, it is recommended that the staff investigate this option. These para-legal institutes exist in most major legal markets, especially New York City. These courses are usually designed for B.A.'s with no previous legal training and therefore the instructional materials might well be on a level appropriate for urban technology students.

STUDENT READING LIST

This outline is keyed to the instructional outline, and the short form citations of the works assigned are also based on that outline.

I.

A. Engdahl, David E., *Constitutional Power: Federal and State In a Nutshell*, (St. Paul: West Publishing Company, 1974), pp. 1-10; pp. 22-24.

McCarthy, David J., *Local Government in a Nutshell*, (St. Paul: West Publishing Company, 1975), pp. 1-28.

B. no assignment

II.

A. Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 19-24.

B. Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 19-24.

C. Mandelker, Daniel R., Managing our Urban Environment, 1974 Supplement, (Indianapolis: Bobbs-Merril Company, 1974), pp. 167; pp. 170-174; pp. 179-181.

III. Gellhorn, Ernest, Administrative Law and Process in a Nutshell, (St. Paul: West Publishing Company, 1972), pp. 1-28; pp. 42-49; pp. 121-131; pp. 132-137.

IV. Hagman, Donald G. Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 33-38.

V. Cohen, Morris L., Legal Research in a Nutshell, (St. Paul: West Publishing Company, 1968), entire except pp. 11 and 12.

West's Law Finder, (St. Paul: West Publishing Company).

West's Sample Pages, (St. Paul: West Publishing Company).

INSTRUCTIONAL STRATEGIES

It is recommended that topics I, II, III, and IV be covered in lecture format, supplemented by recitation sections to permit clarification of the materials. This approach is desirable because there is a broad range of material to be covered, but very little depth is necessary. A small number of well organized lectures should suffice to convey this material. There is relatively little student reading suggested for the same reason; the need for extensive survey coverage with little depth.

The lecture approach and the paucity of reading directed at the substantive portion of this module is designed to free as much class time, and as much student study time as is possible for the legal research segment of the course, which is unavoidably extremely time consuming. The material in topic V should be viewed by the instructor as analogous to teaching a foreign language. It is suggested that this material be taught in small recitation sections, with ample provision of office hours for individualized assistance. Clinical exercises must be at the heart of this segment. Students should be given research assignments of escalating complexity in order to develop their skills. It is virtually impossible to develop a facility in legal research techniques without practice in their application.

This raises the issue of the availability of a law library. At universities with a law school, little problem is presented. Law libraries are usually happy to serve non-law students with legitimate legal research needs. Legal research librarians will be able to provide a great deal of assistance to the students, although it is important that the instructor be available to students with research difficulties to avoid placing an undue and unfair burden on the library staff. The library staff usually will be able to provide a library tour, which will point out the location of basic sources which have been discussed in class. Such a tour should be arranged if possible. It should be also noted that third year law students might well serve as qualified course instructors for this module on planning law.

When no law school is available, alternate sources of a law library must be sought. Possibilities include state legislature libraries, courthous libraries, and law firms. Obviously, special arrangements will have to be made for such libraries, but it is possible that use under the supervision of the instructor could be arranged during non-working hours.

The practice research assignments will have to be tailored to the size of the library available. Smaller libraries may cover only the law of the state where they are located. Practice assignments should start out with very basic skills: locating books, finding statutes, locating cases, finding parallel citations and the like. Later assignments should include the use of Shepherd's Citations, the indices to statutory codes, the digests of cases and the legal encyclopedias. Later assignments should also cover the use of the Federal Register, the Code of Federal Regulations and the state administrative codes. The final assignment should be designed to have a substantive content related to the law of planning and zoning. The instructor may find _How to Find the Law-Student Problem Book_ (St. Paul: West Publishing Company), which is designed to complement Roalfe, useful in devising practice assignments. Some sample assignment questions are set out below.

An Early Assignment

1. What case is reported at 272 US 365 (1926)?
2. Summarize 16 USC 470 (1970).
3. What is the official cite for 20 Cal. Rptr. 638 (1962)?
4. What is the national reported system for 11 Cal. App. 3d 557 (1970)?
5. Locate and cite _Berkey vs. Downing_, a New York case.

6. Locate and summarize New York General City Law Section 96-a.
7. Locate and summarize 33 CFR Section 209.10(b)(2).
8. Locate 39 Federal Register 4503 (1974). Summarize the contents of the notice given therein by the EPA.
9. Locate Hagman, Donald G., *Urban Planning and Land Development Control Law*.
10. Locate the Restatement of Property.
11. Locate 73 Yale L.J. 1119 (1964). What is the subject of the article?
12. Locate the legislative history for the Federal Water Pollution Control Act Amendments of 1972.
    a. What is the Public Law number?
    b. What is the Statutes at Large citations for the act?
    c. What is the US Code citation for the act?
    d. What is the citation for the legislative history?
13. Locate and summarize 378 P. 2d 464 (1963).

An Intermediate Assignment

1. Find all Maryland cases citing Berman vs. Parker, 348 US 26 (1954).
2. Find the CFR sections which promulgate state implementation plans pursuant to the Clean Air Act of 1970.

A Final Assignment

Each student should be assigned to research and write a memo on the law of a different state on a particular contemporary issue in the law of planning, e.g., validity of contract zoning, floating zones, special use districts, planned unit developments, exclusionary zoning, excess condemnation, no-growth zoning, agricultural protection zoning, zoning forbidding development in ecologically sensitive areas.

METHODS OF EVALUATION

The students' mastery of the materials in topics I, II, III, and IV is best assessed by the use of an examination. The questions involved are fairly cut and dried, and therefore, it is recommended that a "long-answer" format be used in which students are asked to supply answers ranging in length from a sentence to a brief paragraph. Short answer questions alone provide inadequate measures of student comprehension in this area, although they may be useful in conjunction with other types of questions. Full length essays are not called for in this context.

The evaluative procedure for the legal research segment is based on the practice assignments. Initial assignments should be ungraded. All assignments should be returned to students with full corrections and provision made for individualized assistance where necessary. The later assignments should be designated graded exercises. These exercises should be graded on their accuracy and in case of the final research memos on substantive questions of law, on their clarity and organization.

AN INSTRUCTIONAL MODULE FOR PLANNING MODELS AND ANALYSIS

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URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

To introduce students to some of the more important methods of analysis and related models which are of use in various planning and/or public works activities. Upon completion of the course, students should be able to recognize real world problems in which these models and analytical methods can be used effectively, they should be able to apply the models on an elementary level, and they should be able to assist modeling specialists in performing more advanced analysis.

INSTRUCTIONAL OUTLINE

I. Introduction -- The Role of Models and Analytical Methods
    A. Science in society
        1. science as knowledge
        2. science as method
    B. Models and their function
        1. verbal
        2. pictorial
        3. physical
        4. mathematical
        5. computer simulation
    C. History of models in planning and management

For a useful introduction to the role of the scientific method in solving operational (i.e., management and planning) problems, see:

> Ackoff, R.L., *Scientific Method: Optimizing Applied Research Decisions*, (New York: John Wiley and Sons, 1962), Chapter 1.

A detailed review of various types of planning and management models and their uses is presented in:

U.S. Environmental Protection Agency, *A Guide to Models in Governmental Planning and Operations*, (Washington, D.C.: U.S. Government Printing Office, 1974), Chapters 1 and 2.

Another good review which is a little dated now can be found in:

Lee, Douglas, *Models and Techniques for Urban Planning*, (Buffalo, New York: Cornell Aeronautical Laboratory, 1968). (Incidentally, the Cornell Aeronautical Laboratory changed its name to CALSPAN a few years ago.)

The following two references contain useful discussions of the role of models and analytical methods in planning:

Isard, W., *Methods of Regional Analysis*, (Cambridge, Massachusetts: M.I.T. Press, 1960), Chapter 1.

and:

Kruekeberg, D.A. and Silvers, A.L., *Urban Planning Analysis: Methods and Models*, (New York: John Wiley and Sons, 1974), Chapter 1.

II. Urban and Regional Models
    A. Population models
        1. population characteristics
            a. spatial distributions
            b. age distributions
            c. measurement methods
        2. population projection models
            a. extrapolation models
            b. cohort survival models
            c. multiple regression models
        3. migration

Some standard and good references for these topics include:

Isard, W., *Methods of Regional Analysis*, (Cambridge, Massachusetts: M.I.T. Press, 1960), Chapters 2 and 3.

Kruekeberg, D.A. and Silvers, A.L., *Urban Planning Analysis: Methods and Models*, (New York: John Wiley and Sons, 1974), Chapter 8.

Bogue, D.J., *Principles of Demography*, (New York: John Wiley and Sons, 1969).

U.S. Census Bureau, *The Methods and Materials of Demography*, (Washington, D.C.: U.S. Government Printing Office, 1971).

Computer programs of population models can be found in:

Greenberg, M.R., Kruekeberg, D.A., and Mantner, R., *Long Range Population Projections for MCDs: Computer Programs and Users Manual*, (New Brunswick, New Jersey: Center for Urban Policy Research, 1973).

B. Measurement methods
  1. index numbers
  2. social indicators

Introductory material on index numbers can be found in:

Freund, John, *Statistics for Economics and Business*, (Englewood Cliffs, N.J.: Prentice-Hall).

and in:

Croxton, F. and Cowden, D., *Applied General Statistics*, (New York: Prentice-Hall, Inc., 1955).

Discussions of social indicators can be found in:

Bauer, R.A., *Social Indicators*, (Cambridge, Massachusetts: M.I.T. Press, 1966), pp. Introduction; pp. 68-86; pp. 302-330.

and in:

Plessas, D.J. and Fein, R., "An Evaluation of Social Indicators," *Journal of American Institute of Planners*, Volume 38, January 1972, pp. 43-51.

A somewhat dated but, nevertheless, excellent discussion of the limitations of the reliability of economic and social data is presented in:

Morganstern, O., On the Accuracy of Economic Observations, (Princeton, New Jersey: Princeton University Press, 1950).

C. Economic Models and Analysis
  1. regional accounts
    a. definitions and structure
    b. location quotients
  2. input-output models
    a. structure and definitions
    b. data sources
    c. applications
  3. statistical (econometric) models
    a. single equation models
    b. multiple equation models
    c. regional models

There are many books available now on these topics. Some of the "classics" in the field include:

Isard, W., Methods of Regional Analysis, (Cambridge, Massachusetts: M.I.T. Press, 1960), Chapters 4, 5, 6, and 8 primarily for topics under 1 and 2 above.

Miernyk, W., The Elements of Input-Output Analysis, (New York: Random House, 1965). A good introduction to input-output models. Contains more advanced material as well.

The following are useful introductions to topics under item 1 above:

Leven, C., "Regional Income and Product Accounts: Construction and Applications," Design of Regional Accounts, Hochwald, E. (ed), (Baltimore, Maryland: The Johns Hopkins Press and Resources for the Future, 1961.

and also:

Tiebout, C., The Community Economic Base Study, (New York: Committee for Economic Development, 1962).

Another useful and more recent introduction to all of the above topics can be found in:

Kruekeberg, D.A. and Silvers, A.L., Urban Planning Analysis: Methods and Models, (New York: John Wiley and Sons, 1974), Chapter 12.

A more advanced and more thorough review of econometric models (both national and regional) is available in:

> Howrey, E.P., "Econometric Models for Policy Analysis," *A Guide to Models in Governmental Planning and Operations*, Environmental Protection Agency, (Washington, D.C.: U.S. Government Printing Office, 1974).

D. Spatial Models
  1. gravity models
  2. transportation models
  3. urban developmen- models

> Kruekeberg, D.A. and Silvers, A.L., *Urban Planning Analysis: Methods and Models*, (New York: John Wiley and Sons, 1974), Chapter 9. Contains an introduction to gravity-type models and their uses.

A somewhat dated but more theoretical approach to this topic:

> Isard, W., *Methods of Regional Analysis*, (Cambridge, Massachusetts: M.I.T. Press, 1960), Chapter 11.

Recent reviews of work accomplished in topics D-2 and D-3 can be found in:

> Ohls, J.C. and Hutchinson, P., "Models in Urban Development," *A Guide to Models in Governmental Planning and Operations*, Environmental Protection Agency, (Washington, D.C.: U.S. Government Printing Office, 1974).

and in:

> Webb, K.W., "Models in Transportation," *A Guide to Models in Governmental Planning and Operations*, Environmental Protection Agency, (Washington, D.C.: U.S. Government Printing Office, 1974).

A good introduction to the important issues of dynamic modeling is available in:

> Lowry, I., "A Short Course in Model Design," *Journal of the American Institute of Planners*, May 1965.

A discussion of some land use and transportation models with some simplified examples is available in:

> Kruekeberg, D.A. and Silvers, A.L., _Urban Planning Analysis: Methods and Models_, (New York: John Wiley and Sons, 1974), Chapter 10.

References to specific large scale land use and transportation models are too numerous to mention here. Listings of such references can be found in the bibliographies of the two review articles noted above (i.e., the Ohls-Hutchinson and the Webb articles in the EOP's _Guide to Governmental Planning and Operations_).

Two interesting critiques of large scale urban development models and transportation models are presented in:

> Brewer, Garry, _The Politician, the Bureaucrat and the Consultant: A Critique of Urban Problem Solving_, (New York: Basic Books, 1973).

and in:

> Lee, Douglas, "Requiem for Large-Scale Models," _Journal of the American Institute of Planners_, Volume 39, Number 3, May 1973.

Brewer's work emphasizes problems of implementation and related political and institutional issues. Lee's paper concentrates on technical issues.

III. Process Models
    A. Benefit/Cost
        1. methodology
        2. time value of money
        3. externalities
    B. CPM/PERT
        1. methods
        2. assumptions
        3. applications

An introduction to these two topics with hypothetical applications and problems in the public sector is given in:

Kruekeberg, D.A. and Silvers, A.L., *Urban Planning Analysis: Methods and Models*, (New York: John Wiley and Sons, 1974), Chapters 6 and 7.

More thorough presentations of CPM/PERT are available in texts on operations research and management science. Two popular texts are:

Hillier and Leiberman, *Introduction to Operations* Research, (San Francisco, California: Holden-Day, 1967).

Wagner, H.M., *Principles of Operations Research With Applications to Managerial Decisions*, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969), Chapter 6.

Planning and public works applications of PERT/CPM are available in:

George, S. and Pyers, Clyde, "The Application of Critical Path Programming to Large Scale Transportation Studies," *Highway Research News*, June 1966, pp. 51-66.

Ontario Department of Municipal Affairs, *Network Diagrams and the Official Plan*, (Toronto: Ontario Department of Community Affairs, 1969).

Vaughan, R.D. "Use of the Critical Path Method in a Pollution Control Program," *Journal of the American Water Works Association*, September 1964, pp. 1092-1096.

Apgar, M., "Systems Management in the New City: Columbia, Md.", *New Tools for Urban Management*, Rosenbloom, R.S. and Russell, J.R., (Boston: Harvard University Graduate School of Business Administration, 1971).

Candueb, I., "CPM Can Be a Tool for Effective, Efficient Execution of Renewal Projects," *Journal of Housing*, October 1966.

More thorough discussions of benefit/cost analysis and the time value of money are available in:

Hinricks, H.H. and Taylor, G.M. (eds), Program Budgeting and Benefit Cost Analysis: Cases, Texts, and Readings, (Pacific Palisades, California: Goodyear Publishing Company, 1969).

Grant, E.L. and Ireson, W.G., Principles of Engineering Economy, (New York: The Ronald Press).

Other related useful and more general topics on public sector economic decisions appear in:

Hirsch, W.Z., The Economics of State and Local Government, (New York: McGraw-Hill, 1970).

Baumol, W.J., Economic Theory and Operations Analysis, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1965).

Haveman, R., The Economics of the Public Sector, (New York: John Wiley and Sons, 1970).

STUDENT READING LIST

It is somewhat redundant to generate a parallel reading list for students. The references listed in the instructional outline cover the itemized topics in a fairly comprehensive manner not only with respect to the breadth and depth of coverage but also with regard to the level of difficulty of the material discussed.

It is generally desirable in an introductory technical course to have one basic text for the course that will provide continuity and a frame of reference for the students (and the instructor, if unable to provide his own). Kruekeberg and Silvers' text titled Urban Planning Analysis: Methods and Models, appears to be as good for this purpose as any one currently available. It covers most of the topics included in the instructional outline at an introductory level.

Reading assignments for these topics are already noted in the previous section. Supplementary readings can be assigned, if time permits, from other references in the instructional outline.

INSTRUCTIONAL STRATEGIES

This course has two goals -- one is to teach the students some elementary skills in analysis and the use of models, the other is to provide them with an overview of the role of models and analytical methods in the planning process. Thus, although students should spend most of their course time working with models and methods of analysis, some, not insignificant, course time should be devoted to how they are used in planning and public works activities. This implies additional readings from the references noted in the instructional outline as well as class discussion (and even outside speakers) on these aspects of the course.

An important issue in teaching this course is the availability of suitable problem sets for the class to work on. Kruekeberg and Silvers' text contain some homework problems. Others, within the context of the city or region where the course is being taught should also be developed. It would probably be desirable to have one required laboratory session per week for working on these problem sets. The lecture and discussion periods should be devoted to other more substantive matters.

The topics are grouped into three sections: introduction to the scientific method and the role of models in the public sector, urban and regional models, and process model. The topics in the first section need no further explanation. The second section is concerned with an introduction to social, economic, and spatial models related to cities and region, (i.e., methods of analysis for the systems under study). The third section presents some methods for making decisions about plans and processes and for controlling the implementation of these plans (i.e., methods of analysis for the process of planning).

METHODS OF EVALUATION

Evaluation can be by a combination of traditional methods - homework assignments, class discussion, term papers or projects, and examinations. A project or term paper where the student has some choice in selecting the topic would be desirable.

AN INSTRUCTIONAL MODULE FOR QUANTITATIVE (STATISTICAL) TECHNIQUES

Sidney Saltzman

Cornell University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM

Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

To develop competence in basic statistical techniques and an understanding of their strengths and limitations. After covering the material in this course, students should become intelligent users of such techniques. They should be able to recognize problems in which statistical analysis could be usefully applied, they should be able to perform such analysis on an elementary level, and they should be able to assist statistical experts in performing more advanced analysis.

INSTRUCTIONAL OUTLINE

I. Introduction
  A. Modern statistics
    1. decision making under uncertainty
    2. its role in science
    3. its role in planning and other professions
  B. Descriptive statistics
    1. summarizing information
  C. Inferential statistics
    1. sample
    2. population
    3. drawing inferences

Freund, John, Modern Elementary Statistics, (New Jersey: Prentice-Hall, 1974), pp. 1-6.

Blalock, H.M., Social Statistics, (New Jersey: Prentice-Hall, 1970), pp. 3-7.

McCarthy, Philip, Introduction to Statistical Reasoning, (New York: McGraw-Hill, 1957), pp. 1-7.

Kruekeberg, D.A. and Silvers, A.L., Urban Planning Analysis: Methods and Models, (New York: John Wiley, 1974).

Ackoff, R.L., Scientific Method: Optimizing Applied Research Decisions, (New York: John Wiley, 1962).

Hammond, R. and McCullaugh, P., Quantitative Techniques in Geography, (Oxford: Clarendon Press, 1974).

II. Data Collection and Measurement
    A. Primary data sources
        1. surveys
        2. interviews
        3. direct inspection
        4. advantages and disadvantages
    B. Secondary data sources
        1. published
        2. non-published
        3. advantages and disadvantages
    C. Measurement scales
        1. nominal
        2. ordinal
        3. interval

Blalock, H.M., Social Statistics, (New Jersey: Prentice-Hall, 1970), pp. 8-30.

McCarthy, Philip, Introduction to Statistical Reasoning, (New York: McCraw-Hill, 1957), pp. 8-27.

Kruekeberg, D.A. and Silvers, A.L., Urban Planning Analysis: Methods and Models, (New York: John Wiley, 1974), pp. 29-36.

Holleb, D.B., Social and Economic Information for Urban Planning, Volume 2, (Chicago: University of Chicago Press, 1969).

U.S. Department of Commerce, Bureau of the Census, The 1970 Census Users Guide, Part I, (Washington, D.C.: U.S. Government Printing Office, 1967).

III. Grouping and Classifying Measurements
    A. Frequency distributions
        1. classes and boundaries
        2. range of values
        3. cumulative distributions
    B. Graphical presentations
        1. histogram
        2. frequency polygon
        3. ogive

Freund, John, *Modern Elementary Statistics*, (New Jersey: Prentice-Hall, 1974), pp. 9-30.

Blalock, H.M., *Social Statistics*, (New Jersey, Prentice-Hall, 1970), pp. 33-44.

McCarthy, Philip, *Introduction to Statistical Reasoning*, (New York: McGraw-Hill, 1957), pp. 30-68.

Huff, D., *How to Lie With Statistics*, (New York: Norton & Company, 1954).

IV. Measures of Location
   A. Means
      1. arithmetic mean
      2. geometric mean
      3. weighted mean
      4. grouped data
   B. Fractiles
      1. median
      2. quartiles
      3. deciles
      4. percentiles
      5. grouped data
   C. Mode
   D. Mid-range

Freund, John, *Modern Elementary Statistics*, (New Jersey: Prentice-Hall, 1974), 31-60.

Blalock, H.M., *Social Statistics*, (New Jersey: Prentice-Hall, 1970), pp. 45-62.

McCarthy, Philip, *Introduction to Statistical Reasoning*, (New York: McGraw-Hill, 1957), pp. 69-104.

V. Measures of Variation or Dispersion
   A. Standard deviation
      1. definition
      2. computing equation
      3. for grouped data
   B. Relative variation
      1. coefficient of variation
   C. Shapes of distribution
      1. symmetrical
      2. skewness
      3. relationship among mean, median, mode

Freund, John, *Modern Elementary Statistics*, (New Jersey: Prentice-Hall, 1974), pp. 63-83.

Blalock, H.M., *Social Statistics*, (New Jersey: Prentice-Hall, 1970), pp. 64-75.

McCarthy, Philip, Introduction to Statistical Reasoning, (New York: McGraw-Hill, 1957), pp. 105-124.

VI. Measuring Relationships Between Variables
  A. Contingency tables
    1. 2 x 2 tables
    2. interpretation
  B. Correlation Coefficient
    1. graph
    2. definition
    3. computing formula
    4. linear vs. non-linear
    5. positive vs. negative
    6. interpretation
  C. Simple linear regression
    1. graph
    2. least squares regression line
    3. slope
    4. intercept
    5. interpretation

Freund, John, Modern Elementary Statistics, (New Jersey: Prentice-Hall, 1974), pp. 325-329; pp. 386-400; pp. 420-425.

Blalock, H.M., Social Statistics, (New Jersey: Prentice-Hall, 1970), pp. 212-213; pp. 273-295.

McCarthy, Philip, Introduction to Statistical Reasoning, (New York: McGraw-Hill, 1957), pp. 299-330; pp. 332-379.

VII. Probability Distribution and Sampling
  A. Binomial distribution
    1. definition and assumptions
    2. parameters
    3. applications
  B. Normal distribution
    1. definition and assumptions
    2. parameters
    3. applications
    4. relationship to binomial
  C. Sampling
    1. definition and importance
    2. random vs. non-random
    3. sampling distributions
    4. central limit theorem

Freund, John, Modern Elementary Statistics, (New Jersey: Prentice-Hall, 1974), pp. 87-139; pp. 170-177; pp. 187-245; pp. 448-454.

Blalock, H.M. Social Statistics, (New Jersey: Prentice-Hall, 1970), pp. 76-84; pp. 97-134; pp. 392-411.

McCarthy, Philip, Introduction to Statistical Reasoning, (New York: McGraw-Hill, 1957), pp. 125-146; pp. 147-173; pp. 174-223.

VIII. Inferential Statistics
  A. Estimation
    1. means
    2. standard deviation
    3. proportion
    4. regression coefficients
    5. correlation coefficients
  B. Hypothesis testing
    1. purpose
    2. two types of errors
    3. relationship to estimation

Freund, John, Modern Elementary Statistics, (New Jersey: Prentice-Hall, 1974), pp. 247-336; pp. 412-419; pp. 425-426.

Blalock, H.M. Social Statistics, (New Jersey: Prentice-Hall, 1970), pp. 89-96; pp. 135-168; pp. 302-311.

McCarthy, Philip, Introduction to Statistical Reasoning, (New York: McGraw-Hill, 1957), pp. 299-365.

STUDENT READING LIST

The aim of this course is to teach students to be proficient in the use of elementary statistical methods. In order to achieve this goal, the course must focus on statistical methodology. This is best accomplished by selecting one primary text for class use and developing the course material around the selected text. Experience indicates that this approach can be a more efficient way of teaching an elementary technical subject than having students read a variety of authors on selected topics.

It is recommend, therefore, that the instructor choose one of the "standard" introductory statistics texts listed under the instructional outline (or other appropriate text) as the primary reference for the course. Because it is likely that many graduates of an urban technology program would be working on economic and social problems, a statistics text in these areas would probably be more useful than an engineering or geography oriented text. With appropriate grounding in basic statistics, students should be able to work on a variety of applications. Freund's Modern Elementary Statistics and McCarthy's Introduction to Statistical Reasoning are two good candidates for consideration as the basic text for this course. McCarthy's book is probably the more elementary of these two, but Freund's was also written for students with little or no mathematics background. Blalock's Social Statistics may be too sophisticated for an undergraduate program. Reading assignments and problem sets should be selected to correspond to the topical outline in the instructional outline

Additional problems in a planning context are available in Kreukeberg and Silvers, Urban Planning Analysis: Methods and Models. Applications of statistical methods to a broad range of societal problems can be found in Statistics: A Guide to the Unknown, edited by Tanur, Mosteller, et al, and published by Holden-Day (San Francisco) in 1972. This can be used for supplementary reading by students, if time permits.

INSTRUCTIONAL STRATEGIES

Because of the significance of the technical material covered in this course, it is important that the instructor have an appropriate background in statistics. Although he (or she) need not be a professional statistician, he should have had substantial graduate work in modern statistical methods. It is unlikely that an instructor without any prior background in statistics could teach this course effectively.

Because of the difficulty in notation, etc., that beginning students would have in working from different texts, it is recommended that one primary text be used for the class. Reading assignments should be made in the selected text and then the same material covered in lectures/discussion sessions. In addition, problems should be assigned for homework and during weekly laboratory sessions.

In an effort to insure students' exposure to conceptual and computational aspects of simple linear regression and correlation, these topics are presented ahead of statistical inference (instructional outline: VII and VIII). This sequence is unusual in an introductory statistics course but is followed here because the specifications for this module prescribed this approach. This creates some problems in selecting reading assignments and problem sets for the students, but it can be done if one exercises some care. It is expected that the topics under VIII in the instructional outline will only be able to be introduced briefly to the class.

In order to expose students to how computers can be used in statistical analysis, there should also be simple assignments on SPSS (or other packaged program) problem sets.

METHODS OF EVALUATION

Homework and laboratory problems should be graded and reviewed with the class weekly. Quizzes should be announced and given on a regular basis. There should be a final exam to require students to review all of the material at the end of the semester. Quizzes and exams should be "open book" so students are not forced to devote time to memorize equations.

AN INSTRUCTIONAL MODULE
FOR PLANNING LAW
MICRO LEVEL CONTROLS

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Cornell University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

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STATEMENT OF OBJECTIVES

To develop an understanding of the fundamental principles of substantive law relating to zoning, subdivision regulation, housing codes, and other types of local land use regulation. The student is also expected to gain an understanding of the administrative procedures associated with local regulation. Legal research techniques directed at local law will also be covered.

INSTRUCTIONAL OUTLINE

A general discussion of the basic references cited follows the instructional outline.

I. Legal Research Involving Local Law
   A. Ordinances
   B. Administrative Law

Cohen, Morris L., Legal Bibliography Briefed, (Drexel Library Quarterly, Volume 1, Number 2, April 1965), pp. 61.

Cohen, Morris L., Legal Research in a Nutshell, (St. Paul: West Publishing Company, 1968), pp. 102-103.

Bittner, Harry and Price, Miles O., Effective Legal Research, (Boston: Little, Brown & Company, revised student edition, 1962), pp. 96-98.

Jacobstein, J. Myron and Mersky, Roy M., Pollack's Fundamentals of Legal Research, (fourth edition; St. Paul: West Publishing Company, 1973), pp. 221-223.

As the references cited above indicate there is very little written about legal research into local law. The basic reason for this state of affairs is that there is little that can be said in a general way about local ordinances and regulations, except that they are often inadequately compiled and are difficult to find. There is no uniform systematic technique for research. Exceptions to the general rule are found in some major cities for which codes are published. Even these are usually out of date due to insufficiently frequent updating. Zoning ordinances and other local land use control ordinances are sometimes printed and are sometimes available through libraries, where they are usually catalogued as if they were books. Planning and law libraries often have large collections. The zoning ordinance for a particular municipality can usually be obtained from some municipal officer, e.g., building inspector, corporation counsel or board of zoning appeals. Minutes and records of actions by Boards of Zoning Appeals may be available from the boards in question, although as a practical matter some such boards are reluctant to make these available. Subdivision regulations and housing and building codes are usually available on an ad hoc basis from the bodies or officers which administer them. This is all done very informally in many areas and the instructor may want to make his own investigations before sending students on practice exercises to obtain these documents. (see instructional methods and evaluative procedures segments)

II. The Substantive Law of Local Regulation
   A. Authority to regulate derived exclusively from state grants of power

McCarthy, David J., Local Government in a Nutshell, (St. Paul: West Publishing Company, 1975), pp. 14-22; pp. 104-120.

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 76-86.

Anderson, Robert, American Law of Zoning, Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 3.01-3.19.

Rathkopf, Arden, The Law of Planning and Zoning, (fourth edition; New York: Clark Boardman & Company, 1975), Volume 1, pp. 2-1 - 2-22.

Williams, Norman, American Planning Law, Chicago: Callaghan & Company, 1974), Volume 1, pp. 177-186.

B. Zoning

For a useful glossary of zoning terms, see:

Anderson, Robert, American Law of Zoning, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Section 12.11.

1. early history and initial Supreme Court approval

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 67-75.

Rathkopf, Arden, The Law of Planning and Zoning, (fourth edition; New York: Clark Boardman & Company, 1975), Volume 1, pp. 1-1 - 1-24.

Williams, Norman, American Planning Law, (Chicago: Callaghan & Company, 1974) Volume 1, pp. 177-187; pp. 85-113.

Anderson, Robert, American Law of Zoning, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 2.01-2.06.

2. requirement of comprehensiveness

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 168-177.

Rathkopf, Arden, *The Law of Planning and Zoning*, (fourth edition; New York: Clark Boardman & Company, 1975), Volume 1, pp. 12-1 - 12-40.

Williams, Norman, *American Planning Law*, (Chicago: Callaghan & Company, 1974), Volume 1, pp. 384-390; pp. 390-556.

3. permitted purposes

Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 86-100.

Williams, Norman, *American Planning Law*, (Chicago: Callaghan & Company, 1974), Volume 1, pp. 187-324.

Anderson, Robert, *American Law of Zoning*, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 7.01-7.36.

4. types of zones

Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 101-112.

Anderson, Robert, *American Law of Zoning*, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 8.01-8.60.

5. vesting of rights

Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 180-182.

6. nonconforming uses

Anderson, Robert, *American Law of Zoning*, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 6.01-6.07.

7. current issues in zoning
    a. flexibility devices: contract zoning; interim zoning; floating zones; planned unit developments; special permits.

Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 117-122; pp. 168-177.

Anderson, Robert, American Law of Zoning, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 5.14-5.16.

Williams, Norman, American Planning Law, (Chicago: Callaghan & Company, 1974), Volume 1, pp. 560-607.

Rathkopf, Arden, The Law of Planning and Zoning, (fourth edition; New York: Clark Boardman & Company, 1975), Volume 1, pp. 12-39 - 12-40; pp. 11-1 - 11-14.

b. exclusionary zoning

McCarthy, David J., Local Government in a Nutshell, (St. Paul: West Publishing Company, 1975), pp. 162-166.

Listokin, David, Land Use Controls: Present Problems and Future Reform, (Rutgers Center for Urban Policy Research, 1974), pp. 105-130; pp. 157-184.

Williams, Norman, American Planning Law, (Chicago: Callaghan & Company, 1974), Volume 3, pp. 1-152a.

Williams, Norman, American Planning Law, (Chicago: Callaghan & Company, 1974), Volume 5, pocket part.

Pynoos, Jon, Schaefer, Robert, and Hartman, Chester, Housing Urban America, (Chicago: Aldine Publishing Company, 1973), pp. 279-289.

c. no-growth and phased growth zoning

Listokin, David, Land Use Controls: Present Problems and Future Reform, (Rutgers Center For Urban Policy Research, 1974), pp. 244-272.

Council on Environmental Quality, Environmental Quality, 1975, pp. 186-187.

d. the taking issue

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 327-331.

Rathkopf, Arden, The Law of Planning and Zoning, (fourth edition; New York: Clark Boardman & Company, 1975), Volume 1, pp. 6-1 - 6-59.

Bosselman, Fred, Callies, David, and Banta, John, The Taking Issue, 1973.

Note: Bosselman, et al, is the definitive work on this subject.

e. aesthetics

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 93-96.

Rathkopf, Arden, The Law of Planning and Zoning, (fourth edition; New York: Clark Boardman & Company, 1975), Volume 1, pp. 14-1 - 14-24.

C. Zoning Procedure
1. the planning process

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 38-55.

Anderson, Robert, American Law of Zoning, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 17.01-17.30.

Williams, Norman, American Planning Law, (Chicago: Callaghan & Company, 1974), Volume 1, pp. 2-68.

2. promulgation of zoning ordinance by local legislature

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 220-228.

Williams, Norman, American Planning Law, (Chicago: Callaghan & Company, 1974), Volume 1, pp. 355-380.

3. Amendments to zoning ordinance

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 191-195.

Williams, Norman, *American Planning Law*, (Chicago: Callaghan & Company, 1974), Volume 5, pp. 3-8; pp. 13-137.

4. variances

Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 196-206.

Williams, Norman, *American Planning Law*, (Chicago: Callaghan & Company, 1974), Volume 5, pp. 9-35; pp. 93-132.

Anderson, Robert, *American Law of Zoning*, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 14.01-14.81.

5. special permits

Williams, Norman, *American Planning Law*, (Chicago: Callaghan & Company, 1974), Volume 5, pp. 137-223.

Anderson, Robert, *American Law of Zoning*, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 15.01-15.32.

6. judicial review

Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 211-220; pp. 236; pp. 241.

Anderson, Robert, *American Law of Zoning*, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 21.01-23.16.

7. enforcement

Hagman, Donald G., *Urban Planning and Land Development Control Law*, (St. Paul: West Publishing Company, 1971), pp. 228-233.

Rathkopf, Arden, *The Law of Planning and Zoning*, (third edition; New York: Clark Boardman & Company, 1975), Volume 3, pp. 66-1 - 66-26.

Anderson, Robert, *American Law of Zoning*, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 13.01-13.06.

8. reminder: zoning is a type of administrative law

See module on macro level controls of planning law. Topic III.

Anderson, Robert, American Law of Zoning, (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 13.07-13.28; 16.01-16.54.

D. Subdivision Regulations
1. regulation and site plan approval mechanisms

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 245-253.

Williams, Norman, American Planning Law, (Chicago: Callaghan & Company, 1974), Volume 5, pp. 271-279.

Anderson, Robert, American Law of Zoning (Rochester: Lawyers' Cooperative Publishing Company, 1968), Sections 19.01-19.48.

Melli, "Subdivision Control in Wisconsin," 1953 Wisconsin Law Review 389 (1953).

2. assessments and exactions

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 253-264.

Williams, Norman, American Planning Law, (Chicago: Callaghan & Company, 1974), Volume 5, pp. 279-290.

Heyman, I.M. and Gilhool, T.K., "The Constitutionality of Imposing Increased Community Costs on New Suburban Residents Through Subdivision Exactions," 73 Yale Law Journal 1119 (1964).

E. Housing and building codes
1. the difference between a housing code and a building code
2. housing codes
3. building codes

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 277-288.

Charles, S., *Survey of the Law of Building Codes*, (American Institute of Planners, 1960). This is the definitive work on building codes.

McCarthy, David J., *Local Government in a Nutshell*, (St. Paul: West Publishing Company, 1975), pp. 160-162.

Pynoos, Jon, Schaefer, Robert, and Hartman, Chester, *Housing Urban America*, (Chicago: Aldine Publishing Company, 1973), pp. 497-510. This is the best explanation of how housing codes really work in practice.

Gribbetz, Judah and Grad, Frank P., "Housing Code Enforcement: Sanctions and Remedies," 66 Columbia Law Review 1250 (1963).

Grad, Frank P., *Legal Remedies for Housing Code Violations*, (National Commission on Urban Problems, Research Report #14, 1968). Gribbetz and Grad are leading authorities on housing codes and their deficiencies.

Building Codes: A Program for Intergovernmental Reform, (Advisory Commission on Intergovernmental Relations, 1966).

Notes on References

The best one volume text in the area is Hagman, *Urban Planning and Land Development Control Law*. The instructor should plan to use this text as his basic reference for material on local regulation. This work's only shortcoming is that despite its recent vintage, the rapid pace of development on the fringes of this area of law makes it less than completely current in a few areas such as topics II B, 7, a-e of the outline. Appropriate supplementary materials have been suggested at these points. Hagman will provide a nearly self-sufficient instructors' manual with the single exception noted here.

Hagman is written on a level which should place it within the range of comprehension of most students. However, its relative comprehensiveness of scope will make it unweildy as a basic text for student use and therefore, I have suggested that students read only the terse McCarthy treatment. (See student reading list below). The relevant Hagman sections may be cited to students for reference purposes and it is recommended that a copy of Hagman be placed on closed reserve in the library for student use. Moreover, if the instructor desires a fuller student reading list he may incorporate the appropriate sections of Hagman in student assignments. The Zoning Game by Babcock is listed as a recommended supplementary reading for students. It provides a critical, realistic and anecdotal supplement to the legal materials and is highly recommended for students who have the time needed to read it.

Rathkopf, Williams, and Anderson are comprehensive multi-volume treatises on the law of planning and zoning, and should be consulted by the instructor when in need of clarification, or for the most definitive exposition of the law available without direct resort to the cases and statutes themselves. Rathkopf is in the midst of revision. As to those volumes which have been revised it is the most current of the treatises, but as to the others, the necessity of referring to the supplementary pocket parts makes the use of Rathkopf slightly less convenient than the use of Williams which is also very current (1974). Anderson is a 1968 work, but like Rathlopf and Williams, is supplemented by pocket parts. Anderson is probably the treatise most often cited by attorneys and courts.

STUDENT READING LIST

Note: This outline is keyed to the instructional outline.

I.

Cohen, Morris L., Legal Research in a Nutshell, (St. Paul: West Publishing Company, 1968), pp. 102-103. Obtain and read sample zoning ordinances, subdivision regulations, and housing and building codes.

II.

A. McCarthy, David J., Local Governments in a Nutshell, (St. Paul: West Publishing Company, 1975), pp. 14-22; pp. 104-120.

B. McCarthy, David J., Local Governments in a Nutshell, (St. Paul: West Publishing Company, 1975), pp. 128-160.

recommended:

Babcock, Richard F., The Zoning Game, (Madison: University of Wisconsin Press, 1966), entire.

C. Bair, Fred H., Text of a Model Zoning Ordinance, (Chicago: American Society of Planning Officials, third edition, 1966).

D. Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 245-264.

E. McCarthy, David J., Local Governments in a Nutshell, (St. Paul: West Publishing Company, 1975), pp. 160-162.

Hagman, Donald G., Urban Planning and Land Development Control Law, (St. Paul: West Publishing Company, 1971), pp. 277-289.

INSTRUCTIONAL STRATEGIES

The instructor can easily outline the material in Topic I in a single lecture, or preferably a recitation section.

Beyond that point, office hours for extensive individualized assistance on the practice exercises suggested below is recommended.

The basic approach suggested for Topic II is lecture presentation by the instructor, supplemented by student practice assignments in the field of local regulation which utilize the skills discussed in Topic I. The instructor should present a survey of the fundamentals of zoning, subdivision regulation, and housing and building codes, as well as the basic procedures associated with each one. Recommended clinical practice assignments include:

1. assignments to locate and summarize the basic state enabling legislation for the various types of regulation, in different states.
2. assignments to locate copies of local zoning ordinances and maps, subdivision regulations and housing and building codes.
3. attendance at public hearings on zoning ordinances, amendments, variances, subdivision approvals, etc.
4. assignments to learn the actual operations of local bodies such as: city planning commission, board of zoning appeals, city council, building inspectors, housing inspectors.
5. assignment to compare a section of a local zoning map with actual uses based on a neighborhood walking tour, in order to discover nonconforming uses.
6. assignment to essay the validity of various provisions of local ordinances, especailly suburban zoning ordinances.

METHODS OF EVALUATION

The uncertain availability of many local law materials renders it difficult to base a large portion of the grade on graded practice exercises, although some weight should be given to this factor. The exercises should be treated in the same fashion as the exercises suggested in the module on macro level planning law. In some cases the written response to the practice exercises may be modified to take the form of a journal describing student research initiatives. Imagination and diligence are the prime attributes to be rewarded in local legal research. The frustrating nature of local legal research renders it essential that the projects be commenced as soon as the module begins.

Mastery of the substantive legal materials is best assessed by an examination. Although this traditional form of grading is now unfashionable in some quarters, it is particularly appropriate in this context where absolute mastery of the fundamentals is essential before original thought becomes worthwhile. A combination of one sentence "long answers," short answers and essay questions is suggested. Essay questions should be oriented to practical situations.

Sample Essay Question

Pretend you are the town attorney for a small village. The village has no zoning code or other land use controls. There have been rumors that a national chain of shopping centers is considering locating a major regional center in the village. The mayor and council are concerned about the possible impact on the village such a center would have.

a. what steps can you recommend?
b. if you recommend enactment of a zoning ordinance, what steps are necessary to accomplish this?
c. when would the rights of the developers to go ahead with their plans vest?
d. would a set of subdivision regulations be useful? how could it be enacted, if considered desirable?
e. could a housing or building code be useful here? if so, how would each one be enacted and implemented?

AN INSTRUCTIONAL MODULE
FOR COLLECTING PRIMARY DATA

Kenneth E. Corey
John E. Kleymeyer
Margaret L. Lotspeich
University of Cincinnati

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

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STATEMENT OF OBJECTIVES

The urban technology undergraduate student will acquire, practice and demonstrate the skills necessary to collect unpublished data in forms that are useful to the senior urban technician and/or the professional urban planner for analysis and the preparation of general community plans. It is assumed that the module will be taught over a period of forty clock hours (i.e., ten four-hour class sessions). It is divided into three sub-modules: (1) survey data; (2) transportation studies; and (3) land use studies. Specifically, the student will produce organized data resulting from: an interview survey; origin-destination study; vehicle capacity study; traffic safety study; mass transit study; land use and community facilities survey; land capability survey; and building conditions survey.

In addition to these content learning objectives, the module will enable the student to develop a working ability to: present information effectively in tabular, graphic, oral, and written form; keep accurate, legible and comprehensible records of own work activities; receive, understand, and follow work instructions; and understand and use planning survey vocabulary.

INSTRUCTIONAL OUTLINE

I. Collection of Survey Data for Planning Analysis
    A. What is surveying? rationale and approaches

    1. brief history of surveys
    2. types and purposes of surveys
    3. the telephone survey
       the mail survey
       the personal survey
    4. communication with the experts
       (planners, social researchers, administrators)
    5. understanding the importance of sampling

B. Conducting the survey
    1. self-administered surveys
    2. interview surveys
    3. other techniques - observation, direct inspection

C. Interviewing
    1. the interview schedule as a communication process
    2. introducing the survey and establishing rapport
    3. recording responses
    4. asking the questions and following the schedule
    5. probing
    6. closing the interview

D. Organizing the data for analysis
    1. editing and checking the schedules
    2. coding and key punching
    3. tabulating and "cleaning" the data

Useful sources for these topics:

Weiss, Carol H. and Hatry, Harry P., *An Introduction to Sample Surveys for Government Managers*, (Washington, D.C.: The Urban Institute, 1971).

Babbie, Earl R., *Survey Research Methods*, (Belmont, California: Wadsworth Publishing Company, 1973), Chapter 4, 8, and 9.

Krueckeberg, Donald A. and Silvers, Arthur L., *Urban Planning Analysis*, (New York: John Wiley & Sons, 1974), Chapter 2.

Sanders, William B., *The Sociologist as Detective*, (New York: Praeger Publishers, 1974), Chapter 2.

Adams, J. Stacy, *Interviewing Procedures: A Manual for Survey Interviewers*, (Chapel Hill: The University of North Carolina Press, 1958).

II. Primary Data Collection for Transportation Studies

A. Vocabulary of the transportation engineer

B. Origin and destination studies
    1. roadside interviews
    2. post-card surveys
    3. telephone surveys
    4. home interviews
    5. license plate studies
    6. taxi, bus, and truck fleet logs

C. Capacity studies
    1. screen line counts
    2. road and street inventory
    3. travel time studies
    4. parking and loading space inventories

D. Safety studies
    1. accident record analysis
    2. intersection turning movement counts

E. Mass transit studies
    1. on-board consumer surveys
    2. on-site transit-station interviews

For a beginning understanding of traffic engineering, transportation studies, and the vocabulary utilized by the professionals:

> Capelle, Donald G., Cleveland, Donald E., and Rankin, Woodrow W., *An Introduction to Highway Transportation Engineering*, (Washington, D.C.: Institute of Traffic Engineers, 1968).

For a better understanding of the urban transportation process:

> *Better Transportation for Your City*, National Committee on Urban Transportation, Public Administration Service, Chicago, 1958.

For a more detailed while very readable account of individual traffic study procedures:

> Pignataro, Louis J., *Traffic Engineering Theory and Practice*, (Englewood Cliffs, New Jersey: Prentice-Hall, 1973).

For a more detailed and rigorous account of transportation studies and their procedures:

> Baerwald, John E. *et al*, *Transportation and Traffic Engineering Handbook*, I.T.E., (Englewood Cliffs, New Jersey: Prentice-Hall, 1976).

For a continuing update of the latest happenings in the world of transportation and transportation planning subscribe to:

Traffic Engineering, Official Publication of
the Institute of Transportation Engineers,
1815 N. Fort Myer Drive, Suite 905, Arlington,
Virginia, 22209.

For additional specialized publications on transportation study topics see the I.T.E. publication order form attached as Appendix A.

For detailed How-To-Do-It-Step-By-Step instructions for transportation study elements see:

Ohio Department of Transportation Procedure
Manuals Nos. 1 through 8. Published by and for
sale by: Vogt, Ivers and Associates, 309
Vine Street, Cincinnati, Ohio, 45202.

Topic:	Manual:
Introduction and Vocabulary	#1, Sections 1.1 - 5.5
Roadside Interview	#5, Section 5.2
Post-Card Surveys	#5, Section 5.2
Telephone Surveys	#5, Section 5.2
Home Interview	#5, Section 5.2
Fleet Logs	#5, Section 5.2
Screen Line Counts	#4, Section 4.1
Road and Street Inventory	#4, Section 4.1
Travel Time Studies	#4, Section 4.1
Parking and Loading Space	#5, Section 5.2
Accident Record Analysis	#4, Section 4.5
Intersection Turning Movement Counts	#4, Section 4.4
On-Board Consumer Surveys	#4, Section 4.6
On-Site Transit-Station Interview	#4, Section 4.6

For additional details, in an easily readable form, on mass transit studies see:

Urban Mass Transportation Travel Surveys, U.S.
Department of Transportation, Washington, D.C.,
August 1972.

III. Primary Data Collection for Land Use Studies
  A. Introduction -- Background to land use studies
    1. the general plan: its purpose and clients
    2. land use
      a. defined - "The use of private property for commercial, industrial, and residential purposes."

   b. role of the land use element in the general plan
3. community facilities
   a. defined - "The variety of public activities that involve physical development, such as schools, parks, playgrounds, and the civic center."
   b. role of the community facilities element in the general plan
4. brief clarification of the policy relationships between land use and community facilities, and:
   a. the transportation element, and
   b. the utilities element

Kent, T.J., Jr., The Urban General Plan, (San Francisco: Chandler Publishing Company, 1964), pp. 18-26.

Howard, John T., "City Planning as a Social Movement, A Government Function, and a Technical Profession," Planning and the Urban Community, Harvey S. Perloff (ed), (Pittsburgh: University of Pittsburgh Press, 1964), Chapter IX, pp. 150-170.

B. The Land use and community facilities survey
1. purpose and scope of the survey
   a. identify and measure land areas and community facilities to generate a spatial and quantitative description of the survey area as inputs to land use planning studies
   b. scale
   c. existing data
   d. prior-year data
2. planning the survey
   a. types of surveys (inspection and combined inspection-interview, and their sources)
   b. selection of a classification system
   c. selection of the units of observation
   d. identification, location, and measurement of land uses and their areas
   e. recording of collected data
   f. mapping data (cross reference "Mapping and Graphics Module")
   g. storing data for update and processing
   h. division of labor for the survey
3. conducting the survey
   a. field demonstration
   b. field exercise
   c. critique of survey products

Chapin, F. Stuart, Jr., Land Use Planning, (second edition; Urbana: University of Illinois Press, 1965), pp. 271-291.

"Land Use," Ohio Procedure Manuals, Number 3, (Cincinnati: Vogt, Ivers, and Associates, 1965), pp. 3.100-3.161.

Weiss, Shirley F., "Land Use Studies," Principles and Practice of Urban Planning, William I. Goodman and Eric C. Freund (eds), (Washington, D.C.: International City Managers' Association, 1968), Chapter 5, pp. 106-118.

So, Frank S., "Governmental and Community Facilities," Principles and Practice of Urban Planning, William I. Goodman and Eric C. Freund (eds), (Washington, D.C.: International City Managers' Association, 1968), Chapter 8, pp. 209-232.

C. Land capability survey (cross reference "Mapping Input and Graphics Module")
  1. purpose -- to collect and present the basic data necessary to conduct a land capability analysis of undeveloped land
  2. data categories and sources include:
     a. vacant land area measurements
     b. slope measurements and topographic characteristics
     c. degree of accessibility to improvements
     d. other as applicable (i.e., soils, geologic structure)
  3. relationship of:
     a. neighborhood densities
     b. legal controls (i.e., existing zoning)
  4. conducting the survey as assigned
     a. classroom demonstration via slide presentation-discussion
     b. laboratory exercise
     c. critique of survey products

Chapin, F. Stuart, Jr., Land Use Planning, (second edition; Urbana: University of Illinois Press, 1965), pp. 271-291.

Weiss, Shirley F., "Land Use Studies," Principles and Practice of Urban Planning, William I. Goodman and Eric C. Freund (eds), (Washington, D.C.: International City Managers' Association, 1968), pp. 118-120; pp. 123-131.

De Chiara, Joseph and Koppelman, Lee, Planning Design Criteria, (New York: Van Nostrand Reinhold Company, 1969), pp. 43; pp. 200.

D. Building conditions survey
1. Purpose - to collect and present the basic input data for the identification of the physical condition of every structure in the survey area. Such survey results can be used in appraising the re-use potential of developed land, and in planning for renewal treatments
2. types of building conditions surveys
3. sources of building condition information
4. building conditions survey instrument and data classes (cross reference "Building Materials Module")
5. survey instructions for a neighborhood building survey
6. conducting the survey
    a. classroom demonstration
    b. division of labor for field exercise
    c. completion of field assignments
    d. critique of the products

For references use examples of building condition instruments and reports from local-area planning departments.

Additional references for land use studies:

Action for Cities: A Guide for Community Planning, Publication #86, Chicago: Public Administration Service, 1950, expecially pp. 52-61.

Committee on the Hygiene of Housing, An Appraisal Method for Measuring the Quality of Housing: A Yardstick for Health Officers, Housing Officials, and Planners, Part I, "Nature and Uses of the Method," 1945; Part II, "Appraisal of Dwelling Conditions," 1946; Part III, "Appraisal of Neighborhood Environment," 1950; New York: American Public Health Association.

How Will America Grow? A Citizen Guide to Land-Use Planning, (Washington, D.C.: Citizens' Advisory Committee on Environmental Quality, April, 1976).

Jackson, John N., Surveys for Town and Country Planning, (London: Hutchinson University Library, 1963), pp. 108-129.

Krueckeberg, Donald A. and Silvers, Arthur L., Urban Planning Analysis: Methods and Models, (New York: John Wiley and Sons, 1974), pp. 318-329.

Lynch, Kevin, Site Planning, (Cambridge, Massachusetts: The M.I.T. Press, 1962).

Standard Land Use Coding Manual: A Standard System for Identifying and Coding Land Use Activities, (Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1965).

STUDENT READING LIST

Student reading for Section I:

Survey Research Center, *Interviewer's Manual Revised Edition*, (Ann Arbor, Michigan: Institute for Social Research, University of Michigan, 1976).

Primary student reading for Section II should be:

Pignataro, Louis J., *Traffic Engineering Theory and Practice*, (Englewood Cliffs, New Jersey: Prentice-Hall, 1973), Chapters 1, 2, 4, 5, 7, 9, 16, and 17.

For a more detailed and rigorous treatment the student might read:

Baerwald, John E. *et al*, Transportation and Traffic Engineering Handbook, I.T.E., (Englewood Cliffs, New Jersey: Prentice-Hall, 1976).

During the course of instruction, the students should also read the appropriate sections of the Ohio Department of Transportation Procedure Manuals (Instructional Outline Section II) or a similar manual.

INSTRUCTIONAL STRATEGIES

Survey Data

The instructional strategies for the topics on surveying should be a combination of lecture, discussion, classroom exercises, role playing, and in-the-field-activities. The most appropriate form of instruction for Topic 1 - "What is Surveying?" should be lecture and discussion. Topic 2 -

"Conducting the Survey" should combine classroom exercises and role playing with discussion. Topic 3 - "Interviewing" would most appropriately lend itself to brief lecture presentations, role playing, and discussion followed by a simple field activity. Topic 4 - "Processing the Raw Data" should utilize the actual data gathered in the field for a classroom exercise after a brief presentation of the procedures to be followed.

Transportation Studies

As a general rule, each topic is introduced through a lecturette supplemented by exhibits of forms and examples of previous studies, where available. This is followed by an assignment of data collection within the local community devised by the instructor with the assistance of the local traffic engineer, city engineer, or community planner where possible. Results of the assignments and the problems encountered will then be critiqued at the next class meeting.

Land Use Studies

This sub-module on land use studies by means of primary data collection stresses the generation of the basic data for input and use in land use analyses and land use planning. The introduction to the sub-module is a lecture-discussion format; it briefly tells the students the reasons for land use studies and specifically describes the contribution of such studies to the preparation of the community's general plan. The remainder of the sub-module consists of three learning activities. All three activities are introduced via lecture, then actual exercises (two field and one laboratory) are assigned by the instructor and executed by the students.

METHODS OF EVALUATION

Survey Data

The methods of evaluation should vary according to the instructional strategy used and the products to be evolved for each topic.

Student learning for Topic 1 can be evaluated by a written test using a combination of objective questions and a listing of steps and procedures. The method of evaluation for Topics 2, 3, and 4 would include critiquing and grading the products of the classroom exercises and field activities.

Transportation Studies

The student's knowledge of transportation studies procedures could be evaluated in basically three ways:

1. an objective testing of his or her knowledge of the vocabulary
2. an open-ended response, either oral or written, detailing in chronological order the steps to be carried out in a particular procedure, or
3. the completion of an experiential application of a procedure to a particular study area.

Land Use Studies

The primary test is a judgement by the instructor of the quality of each of the three survey products assigned to the student. In order to have the students learn by example, brief class critiques are conducted at the end of the exercises; during these sessions positive and negative feedback is given by the instructor and a small jury of professional land use analysts and planners to selected student survey products. A portfolio of survey products is collected by each student as a take-away sample of his/her work for possible later use in seeking employment.

APPENDIX A

PUBLICATION ORDER FORM

		PRICE/COPY ITE member / Non-member	Quantity	Cost
Textbooks	Transportation and Traffic Engineering Handbook	27.50		
	Manual of Traffic Engineering Studies, 4th Edition. Available April 1976	15/18		
	Manual of Traffic Engineering Studies, 1965	5		
	Manual de Estudios de Ingeniera de Transito	7.50/10		
Standards	Adjustable Face Pedestrian Signal Heads. Tentative Revised Standard, 1975	2/3		
	Adjustable Face Vehicular Traffic Control Signal Heads, 1970	2/3		
	A Model Performance Specification for the Purchase of Pavement Marking Paints and Powders. Tentative Revised Standard, 1975	2/3		
	A Model Performance Specification for the Purchase of Thermoplastic Pavement Marking Materials, 1974	3/4		
	A Standard for Flashing and Steady Burn Barricade Warning Lights, 1971	2		
	Pre-Timed Fixed Cycle Traffic Signal Controllers, 1958	2/3		
	Traffic-Actuated Traffic Controllers and Detectors, 1958	2/3		
	Traffic Signal Lamps, 1967	2		
Recommended Practices	A Program for School Crossing Protection, 1972	2/3		
	Bus Stops for Freeway Operations, 1971	2/3		
	Proper Location of Bus Stops, 1967	2/3		
	Recommended Practices for Subdivision Streets, 1965	3/4		
	A Recommended Practice for Special Parking Prohibitions in Connection with Snow Storm Emergencies, 1967	2/3		
	Guidelines for Driveway Design and Location, 1975	3/4		
Informational Reports	Freeway Entrance Ramp Displays	3/4		
	Parking Facilities for Industrial Plants	3/4		
	System Considerations for Urban Freeways	3/4		
	System Considerations for Urban Arterial Streets	3/4		
	Traffic Planning and Other Considerations for Pedestrian Malls	3/4		
	Capacities and Limitations of Urban Transportation Modes	3/4		
	Traffic Signal Visibility	2/3		
	Change of Mode Parking	3/4		
	Goods Transportation in Urban Areas	3/4		
	The Practicality of Aerial Traffic Data Collection	2/3		
	Transportation Planning for Colleges and Universities	3/4		
	Use of Census Data in Transportation Planning	3/4		
	Guidelines for Planning and Designing Access Systems for Shopping Centers	2/3		
	Methods for Citizen Involvement	2/3		
Misc	Dynamic Design for Safety Notebook	35		
	Traffic Devices: Historical Aspects Thereof	3/4		
	Basic Traffic Engineering References, 1 free copy			
Periodicals	Membership Directory ITE	10/20		
	Compendium of Technical Papers 45th ITE Annual Meeting	16/20		
	Traffic Engineering magazine			
	U.S., Canada and Mexico, 1 year	13		
	3 years	29		
	Other countries, 1 year	15		
	3 years	35		
	SUBTOTAL			
	Postage and handling, add 5% to U.S., Canada and Mexico; add 10% for surface mail to other countries.			
	TOTAL			

To Order: Detach entire form, indicate quantity and cost, enclose remittance and mail to the Institute of Transportation Engineers, P.O. Box 9234, Arlington, VA 22209.

Name ____________________

Street Address ____________________

City ____________ State ____________ Zip ____________

AN INSTRUCTIONAL MODULE FOR PERSUASIVE COMMUNICATION

Frank J. Seibold
Youngstown State University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

To enable the urban technologist to interact effectively with citizens and professionals by expert utilization of oral and written modes of persuasive communication.

INSTRUCTIONAL OUTLINE

I. Communication Model (Basic Orientation)
  A. Communicator (transmitter)
  B. Message (content of transmittal)
  C. Media (means of transmittal)
  D. Receiver (target of transmittal)

Emphasis is on the importance and nature of communication.

> Steinberg, C.S., *Mass Media and Communication*, (New York: Hastings House, 1971), pp. 3-27.

II. Persuasive Communication: AIDA Model
  A. Attention getting
  B. Interest arousal
  C. Desire (emotional involvement)
  D. Action

Persuasion is defined as the art of two-way communication. Two-way because it encourages feedback by the receiver. It is opposed dramatically to coercion or one-way, non-feedback communication.

A design for persuasive communication strategy is found in:

> Webster, F.E., Jr., *Marketing Communication*, (New York: Ronald Press, 1971), pp. 35-50.

III. The Role of Reward or Application of the Need-Reduction Learning Model in Persuasive Communication
  A. Need (receiver in a need state)
  B. Cue (communicator's message perceived by receiver as a means of reducing need)

C. Response (receiver acts on message)
D. Need-Reduction (result of an expertly designed message)

Based on the hypothesis that a receiver's needs determine the quality of response made to a persuasive message.

A lucid account of need-reduction theory be investigative pioneers in the field:

> Dollar and Miller, *Personality and Psychotherapy*, (New York: McGraw-Hill, 1950), pp. 25-47.

The role of needs in the development of human potential:

> Maslow, A., *Toward a Psychology of Being*, (Princeton, New Jersey: D. Van Nostrand Company, 1968), pp. 3-8.

IV. Attitudes: Predispositions to Behavioral Actions by the Individual Nurtured by Environmental Influences.
Components:
A. Belief (cognition)
B. Emotion (affect)
C. Tendency to Act (conation)

Persuasive communication as a rational means of:

1. changing negative attitudes
2. reinforcing (rewarding) positive attitudes

The needs humans have for consistency and congruity in attitudes:

> Schramm, W., *The Science of Human Communication*, (New York: Basic Books, 1963), pp. 17-27.

Persuasion, public opinion, and attitudes:

> Cutlip and Center, *Effective Public Relations*, (Englewood Cliffs, New Jersey: Prentice-Hall, 1971), pp. 124-153.

The formation and change of attitudes:

> Brown, J.A.C., *Techniques of Persuasion*, (Baltimore: Penguin Books, 1964), pp. 37-58.

V. Logic of Communication ("Right" thinking)
  A. The Scientific Method as a model for problem-solving
    1. observation (defining the problem)
    2. hypothesis (tentative solution)
    3. experimentation (testing the solution)
    4. verification (problem solved?)
    5. prediction (application to similar problems)
  B. Operationalism or the Principle of Parsimony applied: The simplest explanation fitting all the pertinent facts is the best explanation. Explantions are not to be multiplied unnecessarily.
  C. The Concrete or the Abstract in communication or clarification of meaning

The abstraction ladder as an empirical testing device of message clarity:

Dog -- Abstract
Collie -- Less Abstract
Lassie -- Concrete

Note: The more abstract the verbal terminology, the greater the likelihood of perceptual distortion.

A concise description of the Scientific Method, Operationalism, and Semantics:

Bochrach, A.J., Psychological Research, (New York: Random House, 1972), pp. 59-88.

The relationship of language to reality:

Steinberg, C.S., Mass Media and Communication, (New York: Hastings House, 1972), pp. 28-43.

VI. Ethics of communication ("Right" conduct)
Presenting a Credible Image
  A. Respect for the person
  B. Keeping promises
  C. Honoring confidences
  D. Rendering worthwhile service (even in the absence of personal reward)

Adaptation of an ethical principle, e.g., The Golden Rule, as a criterion of ethical conduct.

An examination of the ethics of persuasion:

Minnick, W.C., The Art of Persuasion, (Boston, Massachusetts: Houghton Mifflin Company, 1968), pp. 278-287.

Ethics viewed from an operational setting:

> Rapoport, A., Operational Philosophy, (New York: Harper and Row, 1965), pp. 116-126.

VII. Personalization vs. Depersonalization
  A. The superiority of one-to-one, personal communication over technological communication
  B. Communication accentuated by a humanized, personal-worth image of man in contra-distinction to a mechanomorphic, "social security number" image.

Person-centered, in-depth communication derived from the psychiatric interview:

> Ruesch, J., Therapeutic Communication, (New York: Norton, 1961), pp. 30-50.

Awareness of the human link in technological communication systems:

> Miller, G., The Psychology of Communication, (Baltimore: Penguin Books, 1969), pp. 45-55.

VIII. The Communication Process: Facilitating the Flow
  A. Determining the right person to contact
  B. Applied communication research theory
    1. two-step flow theory: dissemination of information from leader to follower
    2. Roper's Concentric Circle Theory: information radiates outward from a center of influence to the periphery of followers

The practical application of communication theory:

> Cutlip and Center, Effective Public Relations, (Englewood Cliffs, New Jersey: Prentice-Hall, 1971), pp. 214-262.

IX. Dramatizing the Message
  A. David Ogiloy (Advertising Executive): "You cannot bore (italics mine) people into buying your product."
  B. The magic ingredient of enthusiasm for stimulating the creative imagination
  C. Dramatized messages have their roots in the personal interaction of person "a" interacting with person "b"

Informing people colorfully of how you can benefit them:

> Russel, Beach and Buskirk, Textbook of Salesmanship, (New York: McGraw-Hill, 1974), pp. 225-245.

Strengthening the impact of the presentation:

Thompson, W.M., Salesmanship: Concepts, Management and Strategy, (New York: John Wiley and Sons, 1963), pp. 364-382.

X. Creating Effective Persuasive Messages: A Simplified Model
   A. Premise (point to be made)
   B. Reason (why receiver should respond)
   C. Evidence (examples, illustrations, etc.)
   D. Conclusion (what receiver should do)

Include no more than one premise (point) in any single communication effort.

Adhering to the model format discourages distracting excursions by the receiver from the message track.

Action occurs when the receiver is led by a logical sequence of events to a verifiable conclusion.

Building bridges of understanding between the communicator and receiver:

Steinberg, C.S., The Creation of Consent, (New York: Hastings House, 1975), pp. 31-41; pp. 56-65.

The relationship of language to reality:

Steinberg, C.S., Mass Media and Communication, (New York: Hastings House, 1966), pp. 28-43.

STUDENT READING LIST

Chase, S., Guides to Straight Thinking, (New York: Harper and Row, 1969).

Osborn, A.F., Applied Imagination, (New York: Charles Scribner, 1963).

Hill, N., Think and Grow Rich, (Greenwich, Connecticut: Faucett Publishers, Inc., 1960).

Carnegie, D., How to Win Friends and Influence People, (New York: Simon and Schuster, 1964).

INSTRUCTIONAL STRATEGIES AND METHODS OF EVALUATION

The first half of the course is devoted to thorough discussion of the instructional material with encouragement of student response.

A mid-term examination is given to help students gauge their progress.

The second half of the course is devoted to practical application of the instructional material utilizing oral and written student reports replete with examples and illustrations drawn from their personal experience.

A final examination to help students re-gauge their progress since the mid-term test is given.

Suggested grading procedure to determine the final grade: 25% for mid-term; 25% for final; 25% for oral and written reports; 25% for class participation (determined largely by class attendance).

AN INSTRUCTIONAL MODULE
FOR METEOROLOGY

Albert Matzye
Youngstown State University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

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STATEMENT OF OBJECTIVES

The oft repeated aphorism that "Everybody talks about the weather, but no one does anything about it," is not accurate. It is necessary to recognize that urbanization is one of man's responses to the conditions imposed by the natural environment. Thus, cities are not a natural feature, and their presence serves to alter the so-called natural conditions. Among the natural conditions so altered are those of the atmosphere, and thus, something, however inadvertently, is being done about the weather.

The objectives of this module are two-fold: First, to examine the atmosphere, its variable components, the controls of those components, and their relationship to weather phenomena under natural conditions; second, to discover how urbanization and all that it entails affects the characteristics of the atmosphere and its controls, thus altering the natural behavior of its internal mechanism.

The day to day activity of the city is intimately associated with the weather, as it is involved with such factors as energy consumption, air pollution, storm protection, floods, construction, health and human comfort. It is believed, therefore, that any attempt at making the city more efficient in serving the purposes of man must not neglect the significance of the weather and its ramifications.

INSTRUCTIONAL OUTLINE

I. Introduction to Meteorology
   A. The atmosphere
      1. composition
      2. atmospheric layers
      3. characteristics
   B. The elements of weather
      1. temperature
      2. humidity
      3. pressure and wind
   C. Weather controls
      1. temperature controls
      2. humidity controls
      3. pressure and wind controls

Coverage of these topics may be found in any standard Meteorology text, among which are the following:

> Weisberg, Joseph S., *Meteorology - The Earth and Its Weather*, (Boston, Massachusetts: Houghton Mifflin Company, 1976). A non-technical text designed for the non-science student, hence recommended.
>
> Longley, Raymond W., *Elements of Meteorology*, (New York: John Wiley & Sons, Inc., 1970). A more rigorous treatment including some elementary physics and dynamics of weather. Suggested problems and exercises following each chapter may be useful to instructor.
>
> Trewartha, Glenn T., *An Introduction to Climate*, (fourth edition; New York: McGraw-Hill, 1968). A more detailed coverage of I-B especially recommended for the instructor to supplement less detailed coverage in the Weisberg text. Non-technical explanations.

II. Man and the Elements
   A. Weather and health
   B. Weather and economic activities
   C. Weather and history

Some Meteorology texts touch upon this subject, but of necessity, their coverage is minimal.

> Berke, Jacqueline and Wilson, Vivian, *Watch Out for the Weather*, (New York: The Viking Press, 1951). Effects of the weather on people in general.

Bova, Benjamin, The Weather Changes Man, (Reading, Massachusetts: Addison-Wesley, 1974). Adaptation of races to climatic conditions.

Browning, Iben and Winkless, Nels, III, Climate and the Affairs of Men, (New York: Harper's Magazine Press, 1975). Browning and Winkless argue that particulate matter (dust) in the atmosphere is directly related to cyclical weather changes and make some thought-provoking conditions between weather patterns, world events (past and present), famines, wars, etc.

Clairborne, R., Climate, Man, and History, (New York: Norton, 1970). How weather and climate affect human development and affairs.

Gauquelin, Michael, How Atmospheric Conditions Affect Your Health, translated by Joyce E. Clemow, (New York: Stein and Day, 1971). Study of connection between deaths and the weather.

Landsberg, Helmut E., Weather and Health--An Introduction to Biometeorology, (Garden City, New York: Doubleday and Company, 1969). Human reactions to modifications of the weather, and adaptations to weather.

III. Weather and the City
   A. Location of the city
      1. influence of geography on the weather
   B. Physiography of the city
      1. city site and the weather
   C. The urban atmosphere
      1. the heat dome
      2. pollutants

In recent years a tremendous amount of research concerning the effect of urbanization on the city's weather (and concomitant problems of pollution) has been conducted. Thus, the suggested readings are a representative selection pertinent to this module. Enough readings are suggested so that the instructor may choose those of greatest value in his particular circumstance.

Selected Bibliography on Urban Climate, Prepared by Dr. T.J. Chandler, World Meteorological Organization, Geneva, 1970. A selected bibliography listing studies and research in many countries (and languages). Many of those listed would be hard to find or unavailable, however, the listings provide documentation of the significance attached to the subject.

Meteorological Aspects of Air Pollution, by Robert A. McCormick, World Meteorological Organization, Technical Note Number 106, Geneva, 1970. The first paper in this Technical Note is especially pertinent.

Meteorological Factors in Air Pollution, by A. G. Forsdyke, World Meteorological Organization, Technical Note Number 114, Geneva, 1970. As the Foreword notes, it is, "...designed for non-specialists who from time to time will be required to solve problems or provide advice on matters relating to air pollution." Thus, it is especially pertinent to this section.

Urban Climates and Building Climatology, World Meteorological Organization, Technical Notes Number 108 and 109 respectively, Geneva, 1974. These two volumes are the Proceedings of a Symposium on Urban Climates and Building Climatology. Includes many complete papers (translated if necessary), as well as summaries and abstracts of papers not published in full.

Less rigorous treatment of the city's atmospheric conditions will be found in:

Detwyler, Thomas R., Man's Impact on Environment, (New York: McGraw-Hill, 1971). Part Three is titled, "Man's Impact on Atmosphere and Climate"; contains eight selections applicable to this module.

Detwyler, Thomas R. and Marcus, Melvin G. et al, Urbanization and Environment, (Belmont, California: Duxbury Press, 1972). Two selections in particular deal specifically with the atmosphere: "The Climate of the City," by Reid A. Bryson and John E. Ross; and "Urban Climate, Air Pollution, and Planning," by Wilfred Bach. Several other selections may be considered (e.g., "Water and the City") because of their relationship to the elements of weather.

Anthes, Richard A. et al, The Atmosphere, (Columbus: Charles E. Merrill, 1975). Text which includes chapters on "Air Pollution Meteorology," and "Impact of Weather and Climate on Man."

Wark, Kenneth, and Warner, Cecil F., Air Pollution, Its Origin and Control, (New York: Dun-Donnelley, 1976). Technical, sophisticated text.

McBoyle, Geoffrey (ed), Climate in Review, (Boston, Massachusetts: Houghton Mifflin, 1973). Good selection of readings, including sections on air pollution, weather impact, etc.

Air Pollution, Association of American Geographers, Commission on College Geography Resource Paper Number 2, Washington, D.C. Good paper, touching on sources and mechanics of pollution as well as its significance.

Publications containing a wealth of material include:

Bulletin of the American Meteorological Society, (Usually contains Table of Contents for Monthly Weather Review, Journal of Applied Meteorology, and Journal of Weatherwise), published for the American Meteorological Society.

Local Climatological Data, published by the National Oceanic and Atmospheric Adminstration (NOAA), Asheville, North Carolina. This monthly provides complete weather statistics for official weather stations in each locality. State, national, and world data are also available on a subscription basis. Note: Annual Summaries are also available.

STUDENT READING LIST

This list draws primarily upon those previously recommended readings, selecting those which provide the required information in a manner which does not require extensive background in physics.

Air Pollution, Association of American Geographers, Commission on College Geography Resource Paper Number 2, Washington, D.C.

Blumenstock, David I., The Ocean of Air, (New Brunswick: Rutgers University Press, 1959). A non-technical examination of the atmosphere, including its impact on the human body, agriculture, commerce, industry, war, history, etc.

Calder, Nigel, The Weather Machine, (New York: Viking Press, 1974). Calder wrote the script for the TV program of the same name, broadcast by BBC in 1974, and subsequently on PBS in the U.S. The book is based on the material gathered for the program, but is not the script. Illustrated well.

Cantzlaar, George L., *Your Guide to the Weather*, (New York: Barnes & Noble, 1974). AB&N Everyday Handbook covering the weather for the non-scientific general reader.

Detwyler, Thomas R., *Man's Impact on Environment*, (New York: McGraw-Hill, 1971).

Detwyler, Thomas R. and Marcus, Melvin G. *et al*, *Urbanization and Environment*, (Belmont, California: Duxbury Press, 1972).

Forrester, Frank H., *1001 Questions Answered about the Weather*, (New York: Dodd, Mead & Company, 1957), Covers a lot of territory, e.g., "What is the sky," thru "What part of the brain acts like a thermostat," to "What should the property owner do about weather insurance?"

Lane, Frank W., *The Elements Rage*, (New York: Chilton Books, 1965). Sections on weather extremes: hurricanes, tornadoes, hail, lightning, floods.

McBoyle, Geoffrey (ed), *Climate in Review*, (Boston, Massachusetts: Houghton Mifflin, 1973).

Weisberg, Joseph S., *Meteorology - The Earth and Its Weather*, (Boston, Massachusetts: Houghton Mifflin, 1976). Recommended not only for its treatment of elementary meteorological principles, but also for some consideration of health, urbanization, and pollution (Chapter 11). Glossary and annotated bibliography should also prove to be of assistance. (Should suffice for all of Part I)

Meteorological Aspects of Air Pollution, by Robert A. McCormick, World Meteorological Organization, Technical Note Number 106, Geneva, 1970.

Meteorological Factors in Air Pollution, by A.G. Forsdyke, World Meteorological Organization, Technical Note Number 114, Geneva, 1970.

INSTRUCTIONAL STRATEGIES

Part I introduces the students to the concept that weather is, in fact, a description of the variable characteristics of the atmosphere. The student should become familiar with the composition of the atmosphere, and its constant and variable components. In addition, the elements (measurable qualities and quantities), temperature, humidity, pressure and wind must be defined, and the factors controlling them should be identified and their mechanism understood.

Method

Although the weather is experienced by everyone everyday, and it makes up a significant portion of each day's conversation, it is best to assume that most individuals know very little about the "mechanics" of it; in fact, their knowledge of its operation can be compared to that of the average driver's knowledge of the internal combustion engine and gear ratios.

There is no one best method for presenting the information in this part, and therefore, a combination of techniques should be used. It is recommended that a "discuss-see-do" instructional program be followed. Suggestions follow.

Discuss

It is important that students recognize the necessity of reading about the items to be discussed; first, so that they can have some degree of familiarity of the topic under consideration, and secondly, they will be aware of the resource material available for present and future reference. Class discussions should be conducted to insure that all students acquire the basis for further examination of weather in specific circumstances. It is not necessary, for example, for the students to know precise percentages of each component of the atmosphere, but they should certainly be aware of the variable components and the part they play in determining the weather.

Atmosphere

Once the constant variable components of the atmosphere have been identified, the instructor and students could discuss the question "How do these variables enter and leave the atmosphere?" This should provide enough material to reinforce the variable concept and some of the mechanisms involved in its formulation.

Temperature

Several questions could be formulated here, e.g., "Why doesn't the temperature remain the same?" "Why are nights cooler than the days?" "Why do you go to the lake or beach to cool off?" These and similar questions should lead to examination of the factors which affect temperatures.

Humidity

"Why does it rain?" is a logical beginning, because it will lead to a study of all of the factors involved. Conversely, one can ask, "Why doesn't it rain?"

Pressure/Wind

"What makes the wind blow?" "Why do you prefer a breeze in the summer and can't stand it in the winter?"

Other topics for discussion should include the weather reports (from the TV weather man), e.g., "What's the front(s) he was talking about?" "What does he mean that a low pressure system is dominating a section of the country?" "What is this invading Polar (or Arctic) Air Mass?"

Obviously, the language of meteorology should also be a significant part of the discussions. Terms and phrases used should be defined clearly (and understood) so that they may be used subsequently without need for clarification.

See

Textbook description and classroom discussions should be supplemented by actual observation. Students should be encouraged to examine the sky every day and note differences which can be attributed to changes in the variable components of the atmosphere. They may even wish to make "educated" guesses on subsequent changes in the day's conditions.

Too, they should be introduced to the instruments used in measuring the weather elements. At the very least, the following instruments should be available:

thermometer - several different kinds if possible; a minimum/maximum thermometer would be helpful.

barometer - any good one.

hygrometer - or better still, a sling psychrometer (both would be an extra, since they could be used as checks on each other).

anemometer weather vane - if available, installed.

rain guage

(NOTE: A book of simple experiments including methods for making the above instruments, elementary level, is available:

Trowbridge, Leslie W., Experiments in Meteorology, (Garden City, New York: Doubleday & Company, 1973).

Do

Practical application of the concepts learned. This would involve measuring elements in a variety of locations and under different conditions. For example, students may record temperatures in different locations at the same time, then explain the various factors which may account for the variations. (Several different locations on the campus may be used, or if possible, all students could record temperatures at home - at a certain time of day - and bring in the results for evaluation.) Students may use all of the measuring instruments, and maintain records of findings (and explain possible reasons for these findings).

Part II acquaints the students with the facts, theories, and interpretations concerning the effect of the weather (and climate) on man and his activities.

Method

Since this area of study is one of much conjecture and controversy based on various interpretations of fact, it should be presented in that light. Under the circumstances, the lecture-recitation (or discussion) method, based on readings, is the best instructional technique. Discussions should be so conducted that various facts, theories, and interpretations are considered without, however, necessarily arriving at any conclusions. The net result should be such, that a student becomes aware that the weather plays (and has played) an important part in all of man's activities.

Here again, the personal experiences of the instructor and students may be part of the discussion. Questions regarding "bad days," periods of illness and the like, and their relationship (if any) to prevailing weather conditions may be posed.

Historical periods may be considered (e.g., Napoleon's and Hitler's problems with Russian weather; drought and the price of food; frosts and increase in coffee prices; famines and migrations). Actually any activity and/or condition may lend itself to the discussion - from planning a picnic to the increased fuel consumption during the cold spells.

There are so many possibilities for discussion suggested in the recommended readings, that the problem will be one of selectivity. Thus, the subject should be surveyed rather than covered in depth.

Part III demonstrates how urbanization has influenced the atmospheric conditions, specifically by the alteration of the quantity of variable components, contributed as a result of modern technology and life styles.

Method

At this point, the students are required to draw upon the fundamentals studied in Part I. Basically, they should answer the question, "What effect does the typical urban landscape (and activities thereon) have on atmospheric conditions?" Lecture-discussion should review general concepts regarding the controls of the elements, and how the structure and activities of the city alter the normal operation of these controls.

With their previous experiences in measuring weather elements, students should now be capable of demonstrating actual differences between urban and non-urban sites, and a series of problems/exercises should be formulated to provide the opportunity for such demonstration. Students should be encouraged to suggest problems and/or exercises. Some of the exercises should be in the field so that the effects of the city on the weather and atmospheric conditions in general can be confirmed by the findings.

Some exercises should be hypothetical, since a variety of urban landscapes must be considered to insure that conclusions arrived at in one city will not be arbitrarily applied to others. Sample exercises and problems follow.

The Weather Elements and Controls

Fundamental to the understanding of weather phenomena is familiarity with earth-sun relationships, since the amount of heat energy from the sun received at any given place (excluding for the moment the controls of atmospheric condition, topography, etc) is determined by the angle of the sun's rays and by the length of the daylight period.

Determine which of the following latitudes receive the greatest amount of insolation at the specified periods:

LATITUDE	SUNANGLE	APPROXIMATE PERIOD OF DAYLIGHT	DATE
40° N	---	-----	Mar 21
0°			Mar 21
40° S			Mar 21
23½° S			Dec 21
0°			Dec 21
40° N			Dec 21
0°			June 21

LATITUDE	SUNANGLE	APPROXIMATE PERIOD OF DAYLIGHT	DATE
23½° N	---	-----	June 21
40° N			June 21
90° N			June 21
90° N			Dec 21
90° N			Mar 21

The actual amount of insolation received at a particular place is affected by the characteristics of the atmosphere through which solar radiation must pass. The variable components of the atmosphere will absorb, or reflect, this radiation. What effect do the following have on solar radiation:

Ozone:
Carbon Dioxide:
Dust:
Water Vapor:
Clouds:

Once solar radiation is received at the earth's surface (insolation), the nature of the surface determines the amount which is actually absorbed. How effective are the following in absorbing insolation:

Ice:
Snow:
Sand:
Water:
Grass:
Concrete:
Blackbody:

Similar exercises may be constructed to reinforce basic concepts (there are workbooks in Meteorology and Physical Geography which may be consulted for reference). Exercises dealing with the following concepts are suggested:

Humidity

Problems designed to illustrate that relative humidity is related to the air temperatures. Especially important are problems illustrating that relative humidity is increased by lowering of temperatures, since this is necessary to the understanding of how precipitation, fog, etc., are generated.

Temperature

Problems dealing with the normal lapse rate and adiabatic lapse rates will help students in discovering how (among other things) temperature inversions (significant problems in cities) occur. Too, they are necessary to the understanding of condensation/precipitation. Necessary to the understanding of air mass stability.

Pressure/Wind

Exercises involving prevailing wind directions (and their causes) will be of significance, since they are related to the dispersal of atmospheric pollutants.

More practical exercises may involve the use of measuring instruments, e.g.:

Use of the sling psychrometer in the classroom and comparing the results with those achieved in the adjacent hall, another floor of the building and/or the outdoors. In conjunction with these experiments, students may compute the temperature-humidity index to determine the "comfortability" of their classroom.

Daily recording of atmospheric conditions at a specific spot on the campus - later to be compared with the official weather reports published in the newspaper.

Examination of the Daily Weather Maps to observe changing conditions (If maps are unavailable, the Anthes, *et al*, text *The Atmosphere*, traces the weather pattern for a four day period, complete with synoptic charts).

Other suggestions may be found in the Trowbridge (*Experiments in Meteorology*) book mentioned previously. Students may even be interested in construction of some of the instruments for their own use (methods for doing so are found in Trowbridge).

Man and the Elements

Due to the nature of the material in this section, it is felt that no specific problems are necessary.

Weather and the City

The possibilities for practical experiences in this area are limited only be time, resources, and the ingenuity of the students. With their understanding of the mechanisms of the weather, they should (hopefully) be capable of selecting experiments on their own. However, the instructor may wish to make suggestions.

In *Weatherwise*, (December 1975, Volume 28, Number 6), Frank P. Martin and Paul M. Evans report their findings in "The Heat Island Effect of a Large Shopping Mall in Akron, Ohio."

Such research is within the capabilities of undergraduates, and similar exercises should be used.

Positively, at least one exercise demonstrating the "heat island" concept should be conducted. Small scale samples may be conducted on the campus itself, e.g.:

Problem: Determine the differences in temperature (and humidity) found in a large parking lot and those in an immediately adjacent grass-covered area.

Instruments: A simple measuring tool can be constructed, providing the number of thermometers available is sufficient (Perhaps, a thermometer should be a requirement for the course). By attaching thermometers to a long pole (Approximately 6'), one can construct a simple tool for measuring temperatures at various points above the surface. One thermometer should be attached near one end of the pole (within an inch of the end), with bulb of thermometer nearest the end; another at approximately the 2½' level; and a third near the top. Ideally, the bottom end of the pole should be attached to a wood base (1" board) so that it could stand alone.

Procedure: Allow the pole to remain in position in the center of the parking lot long enough to register the temperatures at varying heights. Record the temperatures and move the pole toward the end of the lot, and do the same. Similar measurements should be made of the grass area near the lot, then farther away. A sling psychrometer may be used to determine the humidity. If possible, similar pole constructions, using wet bulb thermometers may be used simultaneously to record humidity at the levels.

The experiment can then be carried out in the city proper, with various surfaces, parts of town, elevations, etc.

During periods of precipitation, observation of runoff on city streets compared to that in parks, covered slopes, etc., can be used in association with the mechanics of the hydrologic cycle.

In recent times, most cities and industries have acquired the instruments for measuring particulate matter in the atmosphere. A field trip to these operations is recommended, so that students may be aware of the techniques used, and since different locations will be measured, the variations found.

Once the observations and records are made, the most important part of the exercises are to be done.

Drawing upon their knowledge of the factors controlling the condition of the atmosphere, and using the results of their observations and exercises, students should be able to arrive at reasonable conclusions concerning the effect of urbanization on atmospheric conditions. They should be able to support their conclusions in such a manner that it is possible to make generalizations regarding the probable effects of engaging in certain activities (e.g., building, auto use, sewer installation, green belts, etc.) in urban areas.

METHODS OF EVALUATION

A thorough understanding of the weather elements and their controls is necessary to attaining the ultimate objective of this course. Hence, objective tests should be used to test the students' familiarity with these requirements. Objective tests for Part I should be used to test student's knowledge of facts (including the language of meteorology). In addition, these objective tests should be so constructed that an understanding of these facts will be tested.

Thus, tests for Part I should contain factual questions as well as problems which will determine whether or not the student understands the concepts. These may be similar to the problem exercises used in Part I to reinforce understanding.

Because of the nature of Part II, it is felt that evaluation is not necessary. Furthermore, application of the material may be made in Part III.

Since the nature of Part III involves the application of concepts, a more subjective evaluation method should be used. The problems suggested, and subsequent methods and techniques used by the student to resolve them should be evaluated on the basis of: (1) pertinence of the problem to the course objective; (2) ingenuity of the student in the choice of procedures for resolving (or attempting to) the problem; and (3) whether the conclusions reached by the student are supported by his findings.

Problems dealing with the following are suggested for the test in Part I:

Relative Humidity
Heating/Cooling Degree Days
Dew Point
Lapse Rates (Normal, Dry, and Wet Adiabatic)
Solar Radiation/Insolation
Coastal/Continental Temperatures
Temperature Inversions
Air Mass Stability
Temperature-Humidity Index
Day-Night Breezes
Pressure/Wind direction relationship

AN INSTRUCTIONAL MODULE
ON PUBLIC PLANNING AND DEVELOPMENT PRACTICES

Frank J. Costa
The University of Akron

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

This course is the introductory course for the professional planning emphasis within the Urban Technology Development Program. As such, it is concerned with the explanation of planning and the planning process in its generic form as well as a discussion of its application to various settings from the neighborhood to the national level. The primary objectives of the course are:

1. To introduce students to the field of public planning in a general manner.
2. To acquaint students with the vocabulary and nomenclature of the planning field.
3. To discuss planning activity at various levels of operation and organization from the neighborhood to the nation.

INSTRUCTIONAL OUTLINE

I. Planning Vocabulary Unit
    A. Introduction to planning vocabulary
        1. defining planning
        2. defining the planning process
        3. planning as a professional activity
    B. New themes and concepts in planning
        1. relating new themes and concepts to the evolution of the planning field
        2. developing a glossary of terms in planning theory and practice

The best coverage of these topics can be found in:

Abrams, Charles, The Language of Cities, (New York: Avon Books, 1971).

Solnit, Albert, *The Job of the Planning Commissions: A Guide to Citizen Participation in Local Planning*, (Berkeley, California: University Extension, 1974). See especially Chapter Two entitled "Understanding the Language of Planning and Zoning."

Rody, Martin J. and Herbert H. Smith, *Zoning Primer*, (West Trenton, New Jersey: Chandler-Davis Publishing Company, 1960).

Smith, Herbert H., *The Citizens Guide to Planning*, (West Trenton, New Jersey: Changler-Davis Publishing Company, 1961).

II. Planning Organizational Structure Unit
  A. Organization and placement of the planning function within government
    1. the Planning Commission
    2. the Planning Agency
    3. Regional Planning Agencies
    4. Specialized Planning Agencies -- i.e., Manpower, Health, Criminal Justice, etc.
  B. Innovative new forms of organization
    1. the substate planning district concept
    2. planning federalism
    3. intergovernmental relationships in planning

Good coverage of these topics can be found in:

American Society of Planning Officials, *ASPO Planning Advisory Service Information Reports*, Report #146 - "Principles of Organization for Planning Agencies," May 1961; Report #195 - "The Planning Commission - Its Composition and Function," February 1965; Report #211 - "Administration and Management in a Planning Office," June 1969; Report #269 -"Dissent and Individual Initiative in Planning Offices," May 1971; Report #274 - "The Planning Agency and the Black Community," November 1971. Goodman, William I. and Eric C. Freund, (eds). *Principles and Practice of Urban Planning*, (Washington, D.C.: International City Managers Association, 1968). See especially Chapter 18, "The Local Planning Agency: Organization and Structure," by James H. Pickford and Chapter 19, "The Local Planning Agency: Internal Administration," by John T. Howard.

Ranney, David, *Planning and Politics in the Metropolis*, (Columbus, Ohio: C.E. Merrill Publishing Company, 1969).

U.S. Advisory Commission on Intergovernmental Relations, *Regional Decision Making: New Strategies for Substate Districts*, Volumes 1 and 2, (Washington, D.C.: Government Printing Office, 1973).

U.S. Advisory Commisstion on Intergovernmental Relations, *American Federalism: Into the Third Century*, (Washington, D.C.: Government Printing Office, 1974).

III. Planning Process Unit
  A. Goals, objectives and strategies
    1. planning issues identification techniques
    2. goal formulation techniques
  B. Agency work, program development
  C. Involving citizens
  D. Evaluation of work program outcomes
  E. Inter-agency coordination and resource sharing

Useful references for this set of discussions include:

Seeley, J., "What is Planning? Definition and Strategy," *Journal of the American Institute of Planners*, May 1964.

McLouglin, J.B., *Urban and Regional Planning: A Systems Approach*, (London: Faber and Faber, 1969).

Chadwick, G., *A Systems View of Planning*, (London: Pergamon, 1971).

Claire, William H. **(ed)**, *Handbook on Urban Planning*, (New York: Van Nostrand Reinhold Company, 1973). See Chapter 1 by William H. Claire.

IV. Planning Information
  A. Basic information needs in planning
    1. land use information
    2. demographic information
    3. economic activity information
    4. social characteristics
  B. Uses of information in planning
    1. information as the basis for planning issue identification
    2. information as a means to obtain support for planning activities
    3. information as a means to monitor planned change

Useful references for the discussion on land use information include:

Chapin, F. Stuart, *Urban Land Use Planning*, (Urbana, Illinois: University of Illinois Press, 1965).

Goodman, William I. and Eric C. Freund (eds), *Principles and Practice of Urban Planning*, (Washington, D.C.: International City Managers Association, 1968). See Chapter Five on Land Use Studies by Shirley F. Weiss.

Clawson, Marion, R. Burrell Held, Charles H. Stoddard, *Land for the Future*, (Baltimore: Johns Hopkins Press for Resources for the Future, 1960).

U.S. Urban Renewal Administration and Bureau Of Public Roads, *Standard Land Use Coding Manual: A Standard Classification for Identifying and Coding Land Use Activities*, (Washington, 1965).

U.S. Bureau of the Budget, *Standard Industrial Classification Manual*, (Washington, 1963).

Useful references for demographic information include:

Clark, Colin, *Population Growth and Land Use*, (New York: St. Martins Press, 1968).

Stockwell, Edward G., *Population and People*, (Chicago: Quadrangle Books, 1968).

Barclay, George W., *Techniques of Population Analysis*, (New York: John Wiley, 1958).

Isard, Walter, *Methods of Regional Analysis*, (Cambridge, Massachusetts: MIT Press, 1960). See especially pp. 5-79.

For a discussion of general social characteristics of urban settlement see:

Gans, Herbert J., *People and Plans -- Essays on Urban Problems and Solutions*, (New York: Basic Books, 1968).

Glazer, Nathan and Daniel Patrick Moynihan, *Beyond the Melting Pot*, (Cambridge, Massachusetts: Harvard University Press, 1963).

Taeuber, Karl and Alma, *Negroes in Cities*, (Chicago: Aldine Press, 1965).

Perloff, Harvey S., "New Directions in Social Planning," *Journal of the American Institute of Planners*, Volume XXXI, No. 4, 1965, pp. 297-304.

V. Levels of Plan Development Unit
  A. Geographic levels of planning
    1. the neighborhood
    2. the municipality
    3. the region
  B. Integrating Levels of Planning
    1. existing methods
    2. methods suggested in theory
    3. functional planning integration into various geographic levels

References in neighborhood planning include:

Perry, Clarence Arthur, *Housing for the Machine Age*, (New York: Russell Sage Foundation, 1939).

Perry, Clarence Arthur, "The Neighborhood Unit," in *Regional Survey of New York and Its Environs*, (New York: Regional Planning Association, 1929), pp. 22-140.

American Public Health Association, *Planning the Neighborhood*, (Chicago, Illinois: Public Administration Service, 1960).

Kostka, V. Joseph, *Neighborhood Planning*, (Winnepeg, Manitoba: University of Manitoba, 1957).

References for municipal level planning include:

Kent, T.T., *Urban General Plan*, (San Francisco, California: Chandler Press, 1964).

Goodman, William I. and Eric C. Freund (eds), Principles and Practice of Urban Planning, (Washington, D.C.: International City Managers Association, 1968). See especially the following Chapters:

1. Chapter 8 "Governmental and Community Facilities"
2. Chapter 9 "City Design and City Appearance"

3. Chapter 12 "Defining Development Objectives
4. Chapter 13 "The Comprehensive Plan"
5. Chapter 14 "Programming Community Development"

References for regional level planning include:

American Society of Planning Officials, Planning Advisory Service Reports, Report #114 "Annexation Studies, September 1958; Report #255 "Increasing State and Regional Power in the Development Process," March 1970; Report #262 "Metropolitan Planning Policy Implementation," October 1970; Report #239 "Metropolitan Review," October 1968.

Perloff, Harvey S., "Key Features of Regional Planning," Journal of the American Institute of Planners, Volume XXXIV, No. 3, May 1968, pp. 153-159.

VI. Planning Controls and Implementation Unit
   A. Direct controls
      1. zoning
      2. sub-division
      3. urban renewal and redevelopment
   B. Indirect controls
      1. taxation policies

Useful references in zoning and redevelopment laws include:

American Society of Planning Officials, The Text of a Model Zoning Ordinance, (Chicago: 1966).

Babcock, Richard F., The Zoning Game -- Municipal Practices and Policies, (Madison, Wisconsin: University of Wisconsin Press, 1966).

Beuscher, J.H., Land Use Controls -- Cases and Materials, (Madison, Wisconsin: College Printing and Typing, 1966).

Haar, Charles M., Land Use Planning: A Casebook on the Use, Misuse, and Re-Use of Urban Land, (Boston, Massachusetts: Little, Brown, 1959).

Technical Planning Associates, Subdivisions: Design and Review, (Hartford, Connecticut: Connecticut Federation of Planning and Zoning Agencies, 1968).

STUDENT READING LIST

Student reading can be selected from those items cited in the previous section and the following general planning texts:

Claire, William H. (ed), *Handbook on Urban Planning*, (New York: Van Nostrand Reinhold Company, 1973).

Gallion, Arthur B. and Eisner, Simon, *The Urban Pattern: City Planning and Design*, (New York: D. Van Nostrand Company, 1975).

Goodman, William I. and Eric C. Freund (eds), *Principles and Practices of Urban Planning*, (Washington, D.C.: International City Managers Association, 1968).

INSTRUCTIONAL STRATEGIES

Research Paper

Each student shall prepare a research paper. The research paper shall, if possible, be organized as a planning document. To accomplish this, the paper should follow the outline presented here. Research paper topics can be developed around any planning or development issue either of current or historical interest. Examples of themes: citizen involvement techniques, organizing for planning, planning theories, planning history, a critique of current planning practice or methods, planning education, etc.

Organization of the Research Paper

1. The Title and Organization

    A. Title Page
    The title page contains the title of the study, the course number and name, and the date.

    B. Preface or Acknowledgements
    If the study was conducted under unusual circumstances, was done in cooperation with another class member,

or relied heavily upon the input or assistance of others, acknowledgement of these conditions or contributors should be made on this page.

C. Table of Contents
Organize material so that the text will be presented in a logical and understandable format. Consider the material to be presented in each section and organize each section under subheadings whenever possible.

D. List of Tables

E. List of Illustrations

2. The Text

A. Introduction
The introduction informs the reader of the nature of the study and establishes the framework. The introduction defines the problem, describes the need, and states the possible solutions which will guide the course of study. The following elements should be considered in the introduction:

- justification and need for the study
- precise statement of the research problem and research area
- precise statement of the hypotheses (if any)
- definition of terms
- limitations of the study
- review of pertinent literature
- organization of the study

B. Substantive Report
In this section the essential findings of the study are presented. The development of this section should include the classification, analysis, synthesis, and testing of the data collected so that the conclusions of the study may be made evident. In the analysis of the data, the important facts that the collected evidence reveals should be pointed out and relationships that help explain the facts should be established.

The findings of the study may be organized as follows:

- presentation of information
- analysis of information

C. Conclusion
This final chapter in the report should include the following:

- summary of findings
- conclusions, recommendations, predictions

In the summary, the procedures, findings, and evolvement of the problem should be briefly reviewed. The important points of the study are brought together in the summary, but not all the evidence upon which they are based is repeated. The conclusion and recommendations are stated precisely and are related directly to the hypotheses or the formulation of the study.

3. Reference Materials

A. Bibliography

Planning Organization Study

A short paper and oral discussion on the organization and work program of an area planning agency shall be prepared by each student. The study shall take into account the following factors concerning the agency:

a. internal organization
b. funding sources
c. goal setting and work program planning
d. the citizen involvement mechanism (if any)
e. interrelationships with other planning agencies

The student should try to develop as nearly as possible a perfect working model for his agency taking into account each of the factors above and then determining the degree of deviation from the model that the existing operation of the agency may exhibit.

Examples of agencies to be selected include: Akron Planning Department, NEFCO, COG, Summit County Planning Department, Comprehensive Health Planning, AMATS, United

Way, Criminal Justice Commission, etc. The student should consult with the instructor before approaching a planning agency for an interview, information, etc.

Mid-term and Final Examination

METHODS OF EVALUATION

The methods of evaluation should be closely tied to the preceding set of instructional strategies. The allocation of quality points for student evaluation should also be flexible and a suggested format is given below:

1.	research paper	35 points
2.	agency profile	15 points
3.	mid-term examination . . .	25 points
4.	final examination	25 points

AN INSTRUCTIONAL MODULE FOR ACCOUNTING AND FINANCE

Robert E. Arnold
Youngstown State University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

The purpose of this module is to provide the student with the opportunity to learn the basic accounting information necessary for the understanding of financial statements and financial operations. In addition, the student will learn the basics of budgeting, taxes, the financing within school systems and general information about the financial communications and techniques necessary to acquire funds.

INSTRUCTIONAL OUTLINE

I. General Considerations
    A. Accounting fundamentals
        1. basic structure
        2. accounting cycle
        2. books of original entry
    B. Financial statements
        1. balance sheet
        2. income statement
        3. relationship of statements

Good coverage of this material can be found in a number of introductory accounting textbooks, but I recommend one of the following:

Meigs, Walter B., Mosich, A.N., and Johnson, Charles E., Accounting - The Basis for Business Decisions, (Third Edition; McGraw-Hill Book Company), pp. 1-194.

Niswonger, C. Rollin, and Fess, Phillip E., Accounting Principles, (Eleventh Edition, South-Western Publishing Company), pp. 1-160.

Other sources are:

Johnson, Glenn L. and Gentry, James A., Finney and Miller's Principles of Accounting, Introductory, (Seventh Edition; Englewood Cliffs, New Jersey: Prentice-Hall, Inc.).

Schattke, R.W., Jensen, H.G., and Bean, V.L., Accounting-Concepts and Uses, (Boston: Allyn and Bacon, Inc.).

II. Statement Analysis
   A. Ratio analysis
   B. Working capital
   C. Long-term investment

The best kind of coverage of this topic is found in actual published statements, but the techniques can be found in a number of accounting textbooks, including the following:

Kennedy, Ralph D. and McMullin, Steward Y., Financial Statements - Form, Analysis, and Interpretation, (Homewood, Illinois: Richard D. Irwin, Inc.), pp. 344-401.

Myer, John N., Financial Statement Analysis, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc.), pp. 201-265.

Foulke, Roy A., Practical Financial Statement Analysis, (McGraw-Hill Book Company), pp. 178-601.

III. Fund Accounting
   A. General information
   B. Revenue accounting
   C. Expenditure accounting
   D. Capital funding

Rather complete coverage on this subject can be found in the following:

Lynn, Edward S. and Freeman, Robert J., Fund Accounting, Theory and Practice, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc.), pp. 131-320.

Additional coverage can be provided in:

Mikesell, R.M. and Hay, Leon E., Governmental Accounting, (Homewood, Illinois: Richard D. Irwin, Inc.), pp. 1-153.

IV. Financing
  A. Present value concept
  B. Money markets
  C. Underwriting techniques

The sources of information on these subjects are varied, but the following publications will provide the required material:

Eiteman, Wilford J., Dice, Charles A., and Eiteman, David K., The Stock Market, (Fourth Edition; McGraw-Hill Book Company), pp. 1-208.

Weston, J. Fred and Brigham, Eugene F., Essentials of Managerial Finance, (Third Edition; Hinsdale, Illinois: The Dryden Press), pp. 213-239; pp. 297-323.

Mao, James C.T., Corporate Financial Decisions, (Palo Alto, California: Pavon Publishers), pp. 351-507.

V. Specific Accounting Situations
  A. Planning and budgeting
    1. general background
    2. operations budget
    3. capital budget
  B. Taxes
    1. federal income tax
    2. state and local taxes
    3. payroll taxes
    4. property taxes
  C. School systems
    1. accounting methods
    2. financing policies

Thorough coverage of this material can be found in the following:

Matz, Adolph, Curry, Othel J. and Usry, Milton F., Cost Accounting: Planning and Control, (Fifth Edition; South-Western Publishing Company) pp. 379-496.

Crowningshield, Gerald R. and Gorman, Kenneth A., Cost Accounting - Principles and Managerial Applications, (Third Edition; Boston: Houghton Mifflin Company), pp. 401-449.

Weston, J. Fred and Brigham, Eugene F., Essentials of Managerial Finance, (Third Edition; Hinsdale, Illinois: Dryden Press), pp. 12-36; pp. 96-134; pp. 240-270.

Mao, James C.T., Corporate Financial Decisions, (Palo Alto, California: Pavan Publishers), pp. 69-92.

Lynn, Edward S. and Freeman, Robert J., Fund Accounting Theory and Practice, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc.), pp. 797-848.

Mikesell, R.M. and Hay, Leon E., Governmental Accounting, (Homewood, Illinois: Richard D. Irwin, Inc.), pp. 452-500; pp. 547-594.

Sommerfeld, Ray M., Anderson, Hershel M., and Borck, Horace R., An Introduction to Taxation, pp. 1/1-4/11; pp/ 12/1-12/4; pp/ 28/1-28/13.

STUDENT READING LIST

I. General considerations

I recommend one of the following textbooks be used by the students:

Meigs, Walter B., Mosich, A.N., and Johnson, Charles E., Accounting - The Basis for Business Decisions, (Third Edition; McGraw-Hill Book Company), pp. 1-194

Niswonger, C. Rollin and Fess, Phillip E., Accounting Principles, (Eleventh Edition; South-Western Publishing Company).

Johnson, Glenn L. and Gentry, James A., Finney and Miller's Principles of Accounting, Introductory, (Seventh Edition; Englewood Cliffs, New Jersey: Prentice-Hall, Inc.).

Schattke, R.W., Jensen, H.G., and Bean, V.L., Accounting - Concepts and Uses, (Boston: Allyn and Bacon, Inc.).

II. Statement Analysis

A number of textbooks, including the following:

Kennedy, Ralph D. and McMullin, Steward Y., Financial Statements--Form, Analysis, and Interpretation, (Homewood, Illinois: Richard D. Irwin, Inc.), pp. 344-401.

Myer, John N., Financial Statement Analysis, Englewood Cliffs, New Jersey: Prentice-Hall, Inc.), pp. 201-265.

III. Fund Accounting

Readable coverage on this subject is found in the following:

Mikesell, R.M. and Hay, Leon E., Governmental Accounting, (Homewood, Illinois: Richard D. Irwin, Inc.), pp. 1-153.

IV. Financing

The following publications will provide interesting material for the student:

Eiteman, Wilford J., Dice, Charles A. and Eiteman, David K., The Stock Market, (Fourth Edition; McGraw-Hill Book Company), pp. 1-208.

Weston, J. Fred and Brigham, Eugene F., Essentials of Managerial Finance, (Third Edition; Hinsdale, Illinois: The Dryden Press), pp. 213-239; pp. 297-323.

V. Specific Accounting Situations

Thorough coverage of this material can be found in the following:

Matz, Adolph, Curry, Othel J. and Usry, Milton F., Cost Accounting: Planning and Control, (Fifth Edition; South Western Publishing Company), pp. 379-496.

Crowningshield, Gerald R. and Gorman, Kenneth A., *Cost Accounting - Principles and Managerial Applications*, (Third Edition; Boston: Houghton Mifflin Company), pp. 401-449.

Weston, J. Fred and Brigham, Eugene F., *Essentials of Managerial Finance*, (Third Edition; Hinsdale, Illinois: Dryden Press), pp. 12-36; pp. 96-134; pp. 240-270.

Mao, James C.T., *Corporate Financial Decisions,* (Palo Alto, California: Pavan Publishers pp. 68-92.

Lynn, Edward S. and Freeman, Robert J., *Fund Accounting - Theory and Practice,* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc.), pp. 797-848.

Mikesell, R.M. and Hay, Leon E., *Governmental Accounting*, (Homewood Illinois: Richard D. Irwin, Inc.), pp. 452-500; pp. 547-594.

Sommerfeld, Ray M., Anderson, Hershel M. and Brock, Horace R., An Introduction to Taxation, pp. 1/1-4/11; pp. 12/1-12/4; pp. 28/1-28/13.

INSTRUCTIONAL STRATEGY

This module attempts in a very short period of time, to prepare the student to handle situations that by their very nature, are extremely complex *situations*. With this in mind, it is important that the teacher be well versed in the subject, because the only way this amount of material can be presented in this time frame is with a good classroom presentation.

Each of the eight sections and subsections should have reading and problem material assigned, before the section is begun. The student should be instructed to have read the material thoroughly and have at least *attempted all* questions and problems.

As each section or subsection is begun, the teacher should lecture, on a give and take basis, on the material already read by the student. This should take approximately five classroom hours. The problems assigned should then be covered completely in class with the students being given the opportunity to ask questions about and correct errors in their homework. This should use about four classroom hours. The last two hours of each of the five major sections should be an examination including both subjective and problem solving techniques. These tests should be vigorous enough for the top students to be challenged and broad enough for the lower range student to pass in spite of missing one or two points previously covered in class. The test should be given back and reviewed with the students.

The above technique should be followed in each of the sections with some slight time variations to adapt to the specific subjects. At the completion of this work the classroom time will be eighty hours. The student should be instructed that at least an additional 80 hours of out of class time will be required to properly understand this material.

Where a quarter system is used this material will have to be covered in a four hour course over two quarters and where the sixteen week semester system is used the material can be covered with one five hour semester course.

METHODS OF EVALUATION

The best method of evaluation for this kind of material is the testing at the end of each section, as noted above. For this method to be successful, it is imperative that all material covered within the section be tested in one form or another. It is best that the test itself be long enough to put the student under sufficient pressure so that he or she can become acquainted with the kind of pressure that will be faced in actual practice.

The follow up review of the test is critical to the learning process. It gives the student a chance to rethink the answer given and view it in light of the proper answer.

AN INSTRUCTIONAL MODULE FOR URBAN ECONOMICS TECHNOLOGY

Anthony H. Stocks
Youngstown State University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Support by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

The purpose of this course is to familiarize the student with some basic analytical techniques and theories employed by Urban Economists in exploring the characteristics and problems of an urban area. Further, it is intended that the student will be able to apply these tools to a particular urban area of concern. To accomplish this ambitious task, the following methodology is proposed:

1. Introduce the students to each technique and theory.
2. Work up examples to illustrate how each technique is empirically implemented.
3. Provide the student with a set of data, either actual or simulated, and require him to obtain results from application of each technique.

INSTRUCTIONAL OUTLINE

I. On the nature and characteristics of public goods
    A. Public goods vs. private goods
        1. demand conditions for private goods
        2. demand conditions for public goods
        3. supply conditions for private goods
        4. supply conditions for public goods
    B. Criteria for determining the appropriate level of government at which particular public goods should be provided
        1. spatial extent of the benefit area
        2. economies of scale associated with the specific public goods
        3. degree of variation in demand for the goods
        4. the nature and extent of externalities

An excellent analysis of this section is presented by:

Bish, Robert L. and Nourse, Hugh O., *Urban Economics and Policy Analysis*, (New York: McGraw-Hill Book Company, 1975), pp. 109-140.

Part I-A is effectively covered in:

Herber, Bernard P., *Modern Public Finance*, (third edition; Homewood, Illinois: Richard D. Irwin, Inc., 1975), pp. 22-44.

Musgrave, Richard A. and Musgrave, Peggy B., *Public Finance In Theory and Practice*, (second edition; New York: McGraw-Hill Book Company, 1976), pp. 49-80.

Anderson, William H., *Financing Modern Government*, (Boston: Houghton Mifflin Company, 1973), pp. 18-39.

A more advanced and complete review of the theory of public goods and their provision is found in:

Mueller, Dennis C., "Public Choice: A Survey," *Journal of Economic Literature*, Volume 14, No. 2, June 1976, pp. 395-433.

Two readings of value for Part I-B are:

Advisory Commission on Intergovernmental Relations, *Performance of Urban Functions: Local and Areawide*, Volume M-21, September 1963, pp. 41-60.

Stocks, Anthony H., *Considerations of Scale in Providing State and Local Public Goods*, (Morgantown, West Virginia: West Virginia University, Bureau of Business Research, June 1968), pp. 1-10.

II. Urban growth -- theory and estimation
    A. Economic base
        1. discussion of the theory
        2. explanation of the different methods to distinguish basic from non-basic activities
        3. critique of method and concept
    B. Introduction to input-output analysis
        1. discussion of the theory
        2. method of constructing I-O tables
        3. limitations of the analysis

The best single source to cover the material in this section is found in:

Heilbrun, James, *Urban Economics and Public Policy*, (New York: St. Martin's Press, 1973), pp. 137-175.

A more brief treatment is found in:

Brown, Douglas M., *Introduction to Urban Economics*, (New York: Academic Press, 1974), pp. 46-67.

or:

Hoover, Edgar M., *An Introduction to Regional Economics*, (New York: Alfred A. Knopf, Inc., 1971), pp. 221-248.

An extensive and highly detailed discussion of the Economic Base Theory is contained in a readings book by:

Pfouts, Ralph W., *The Techniques of Urban Economic Analysis*, (West Trenton, New Jersey: Chandler-Davis Publishing Company, 1960).

A highly readable explanation of Input-Output Analysis and its applications is found:

Miernyk, William H., *The Elements of Input-Output Analysis*, (New York: Random House, 1965).

More information on the techniques to measure basic economic activity can be obtained from:

Hildebrand, George H. and Mace, Arthur, "The Employment Multiplier in an Expanding Economy," *Review of Economics and Statistics*, Volume 32, August 1950, pp. 241-249.

and:

Tiebout, Charles M., *The Community Economic Base Study*, (Committee for Economic Development, Paper No. 16, December 1962).

III. Efficiency in the public sector
    A. Benefit-cost analysis
        1. exposition of the theory
        2. applications in government

        3. strengths and weaknesses
    B. Cost-effectiveness technique
        1. analysis of the concept
        2. applications in government
        3. problems of measurement and implementation

A concise and well-written source on public budgeting efficiency is:

> Herber, Bernard P., *Modern Public Finance*, (third edition; Homewood, Illinois: Richard D. Irwin, Inc., 1975), pp. 401-419.

A somewhat more rigorous analysis is found in:

> Musgrave, Richard A. and Musgrave, Peggy B., *Public Finance In Theory and Practice*, (second edition; New York: McGraw-Hill Book Company, 1976), pp. 154-202.

The definitive discussion of benefit-cost analysis is found in:

> Turvey, R., and Prest, A.R., "Cost-Benefit Analysis: A Survey," *Economic Journal*, December 1965, pp. 683-735.

An excellent review of cost-effectiveness theory and its applications is contained in:

> Hitch, Charles, J. and McKean, Roland N., *The Economics of Defense in the Nuclear Age*, (Cambridge, Massachusetts: Harvard University Press, 1960).

IV. Urban fiscal issues
    A. Sources of funds
        1. the property tax
        2. sales taxes
        3. income taxes
        4. other tax sources
        5. user charges
        6. intergovernmental transfer payments
    B. Fiscal imbalance
        1. the Federal Government vs. the states and municipalities
        2. the central cities vs. the suburbs

A concise discussion of urban financial sources and problems is found in:

Bish, Robert L. and Nourse, Hugh O., Urban Economics and Policy Analysis, (New York: McGraw-Hill Book Company, 1975), pp. 141-174.

Somewhat more extensive in the discussion of this topic is the work of:

Heilbrun, James, Urban Economics and Public Policy, (New York: St. Martin's Press, 1974), pp. 317-362.

An excellent discussion of urban tax sources is found in:

Muth, Richard F., Urban Economic Problems, (New York: Harper and Row, 1975), pp. 328-360.

For a very concise statement on urban finance see:

Hirsch, Werner Z., Urban Economic Analysis, (New York: McGraw-Hill Book Company, 1973), pp. 396-418.

STUDENT READING LIST

The Nature and Characteristics of Public Goods

The best source of information for students on this topic is found in:

Bish, Robert L. and Nourse, Hugh O., Urban Economics and Public Policy Analysis, (New York: McGraw-Hill Book Company, 1975), pp. 109-140.

For a more elementary treatment of this material see:

Anderson, William O., Financing Modern Government, (Boston, Massachusetts: Houghton Mifflin Company, 1973), pp. 8-39.

Those instructors seeking a more rigorous and extensive discussion here should assign:

Herber, Bernard P., Modern Public Finance, (third edition; Homewood, Illinois: Richard D. Irwin, Inc., 1975), pp. 22-44.

and:

Advisory Commission on Intergovernmental Relations, *Performance of Urban Functions: Local and Areawide*, *Volume M-21, September 1963, pp. 41-60.*

Urban Growth -- Theory and Estimation

The preferred student assignment for this section is:

Heilbrun, James, *Urban Economics and Public Policy*, (New York: St. Martin's Press, 1973), pp. 137-175.

Other useful discussions of this topic are found in:

Hirsch, Werner Z., *Urban Economic Analysis*, (New York: McGraw-Hill Book Company, 1973), pp. 186-232.

Brown, Douglas M., *Introduction to Urban Economics*, (New York: Academic Press, 1974), pp. 46-67.

and:

Hoover, Edgar M., An *Introduction to Regional Analysis*, (New York: Alfred A. Knopf, Inc., 1971), pp. 221-248.

Efficiency in the Public Sector

The best source of student information on this topic is found in:

Herber, Bernard P., *Modern Public Finance*, (third edition; Homewood, Illinois: Richard D. Irwin, Inc., 1975), pp. 401-419.

Other useful sources listed in ascending order of rigor are:

Bish, Robert L. and Nourse, Hugh O., *Urban Economics and Policy Analysis*

and:

Musgrave, Richard A. and Musgrave, Peggy B., *Public Finance in Theory and Practice*, (second edition; New York: McGraw-Hill Book Company, 1976), pp. 154-202.

Urban Fiscal Issues

First choice for student reading is:

Bish, Robert L. and Nourse, Hugh O., *Urban Economics and Public Analysis*, (New York: McGraw-Hill Book Company, 1975), pp. 141-174.

Other useful sources for student consumption are:

Hochman, Harold M. (ed), *The Urban Economy*, (New York: W.W. Norton Company, Inc., 1976), pp. 41-94.

Grieson, Ronald E. (ed), *Urban Economics: Readings and Analysis*, (Boston, Massachusetts: Little, Brown, and Company, 1973), pp. 415-443.

and:

Schreiber, Arthur F., Gatons, Paul K. and Clemmer, Richard B. (eds), *Economics of Urban Problems*, (Boston, Massachusetts: Houghton Mifflin Company, 1971), pp. 202-278.

INSTRUCTIONAL STRATEGIES

Since this course is designed to stress applications of economic concepts to urban areas, the instructor should pursue problem solving methods of instruction where possible. In the first part of the course dealing with public goods, it would be useful to develop a matrix such as that shown in Appendix A. The instructor would supply a list of 40 or 50 products like those shown in Column 1 and each student would be asked to check the appropriate columns to indicate the type of product and the appropriate level or levels of government at which the good should be provided. This exercise, of course, would be assigned following the classroom lectures and discussions on the nature and provision of public goods and the distinction between them and private goods. Upon completion of the matrix, it would be desirable to devote one class period to discuss how the students classified the products assigned and any additional goods the instructor wished to include for class discussion. In addition, students should be able to state why they assigned any good to one or more levels of government; that is, they should justify their choices.

An interesting project for the second segment of the course, the urban growth section, would be to have the students do an economic base study for a county or metropolitan area of their choice, using the location quotient technique. Appendix B shows an application of this method for the Youngstown-Warren SMSA for 1972 including an employment multiplier following the totals. Data to complete the base-non-base calculations can be obtained for any county or metropolitan area from the sources specified in Appendix B. Moreover, each state bureau of employment services provides monthly employment data by industrial classification for the major metropolitan areas in the state. In Ohio, for example, such information is contained in a report entitled Ohio Labor Market Information published by the Division of Research and Statistics, Ohio Bureau of Employment Services. By preparing several base studies for a metropolitan area over five or ten year intervals, it is possible for students to see how the economic base changes as well as the employment multiplier.

Following a discussion of the theory of benefit-cost analysis and an exposition of the methodology in section three of the course, the instructor should prepare several examples of hypothetical government projects with data on costs and benefits over their projected life and then have the students compute the benefit-cost ratios at different discount rates. For example, suppose a metropolitan area government is considering a five-year mosquito abatement program. The costs of the program are estimated to be $150,000 in the first year, $125,000 in the next two years, $100,000 in the fourth year, and $80,000 in the fifth year. Benefits are estimated to be $250,000 in the first year, $180,000 the second year, $125,000 in the third year, and $70,000 in the fourth and fifth years. Assuming the program can be implemented immediately and the discount rate is 4 per cent, the present value of the program cost is $543,046, the present value of the benefit stream is $660,713, and the benefit-cost ratio is 1.22. The project is meritorious. If the discount rate is raised to 8 per cent, the present value of the program cost becomes $511,093, the value of the benefits $630,854, and the benefit-cost ratio, 1.23. Again, the project is desirable.

In the final section of the course, the instructor should explore carefully with the students the tax sources available to urban government units and the demands for public goods placed upon them. He should also attempt to bring the learning experiences of the students together by way of a meaningful summary of the work accomplished. One effective method to do so is to use a simulation of a local economy with emphasis on the role of government. The Community Land Use Game or CLUG is an excellent learning experience for students who play it, since it incorporates many of the principles and problems that are the focal point of this class. At least four to six class periods should be set aside to play and evaluate the performance of the students in the game.

METHOD OF EVALUATION

While it seems appropriate to give a final examination that includes identification and application of the concepts the student has been exposed to during the quarter, perhaps most of the emphasis in evaluating performance should be placed upon the quality of work on the projects undertaken during the quarter. How well he or she grasps the concepts and can apply them should become evident from the quality of work demonstrated on these projects. Indeed, it would be appropriate to include problems on the final examination simular to those done during the quarter.

Considerable insight as to how well the student has grasped the material can also be obtained through careful observation of how quickly he or she is able to grasp the nature of the CLUG game and develop strategies to obtain desired objectives. Such an observation should be part of the overall evaluation of student learning.

APPENDIX B
NON-AGRICULTURAL EXPORT EMPLOYMENT, YOUNGSTOWN-WARREN SMSA, 1972
(in thousands)

Industry Classification	Total Employment	Non-Basic Employment	Basic (Export) Employment	% of Total Basic Employment
Mining	.3	.3	-0-	-0-
Contract Construction	7.1	7.1	-0-	-0-
Manufacturing:	88.1	26.6	55.3	99.6
Durable Goods:				
Stone, Clay & Glass	2.5	1.9	.6	1.1
Primary Metals	43.4	3.5	39.9	71.9
Fabricated Metal Products	10.4	3.8	6.2	11.2
Nonelectric Machinery	4.9	4.9	-0-	
Electric Equipment & Supplies	4.5	4.5	-0-	
Transportation Equipment	13.5	4.9	8.6	15.5
Miscellaneous Manufacturing	3.1	3.1	-0-	
Nondurable Goods:				
Transportation & Public Utilities	10.2	10.2	-0-	
Wholesale Trade	6.6	6.6	-0-	
Retail Trade	33.1	32.9	0.2	0.4
Finance, Ins. & Real Estate	6.0	6.0	-0-	
Services	28.6	28.6	-0-	
Government	21.5	21.5	-0-	
Federal	4.9	4.9	-0-	
State & Local	16.6	16.6	-0-	
TOTALS	201.5	146.0	55.5	100.0

$$Em = \frac{TE}{BE} = \frac{201.5}{55.5} = 3.63$$

Source: Computed from United States Department of Labor, Bureau of Labor Statistics, *Handbook of Labor Statistics, 1973* (Bulletin No. 1790), pp. 95-97; and United States Department of Labor, Bureau of Labor Statistics, *Employment and Earnings: States and Areas, 1939-1972* (Bulletin No. 1370-10), pp. 519-520.

APPENDIX A

CLASSIFICATION OF GOODS AND SERVICES

					Supply By:					
	Public Good		Private Good			Public Sector				
Product	Pure Public	Quasi Public	Pure Private	Quasi Private	Private Sector	Federal Govt.	State Govt.	County Govt.	Metro Govt.	Municipa Govt.
Hot Dogs										
Defense Expenditures										
Fire Protection										
Steak										
Police Protection										
Water Supply										
Sewage										
Garbage Disposal										
Parks										
Hair Cuts										
Mosquito Control										
Welfare Expenditures										
Rodent Control										
Higher Education										

AN INSTRUCTIONAL MODULE
FOR THE NATURAL SCIENCE ELEMENT

Ikram Khawaja

Youngstown State University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM

Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

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STATEMENT OF OBJECTIVES

In as much as the natural sciences are concerned with, among other things, the surface of the earth, its configuration, the processes acting upon it, its materials, and the interrelationships of its fauna and flora, it is essential that the urban technologist be introduced to consider the natural sciences.

To meet that objective this module is designed to give students an overview and appreciation of physical and biological aspects of the total terrestrial environment. It is hoped that through this exposure they will be made aware of the complexity and importance of the natural science factors in the environment.

INSTRUCTIONAL OUTLINE

I. Level of Organization
    A. Chemical
        1. elements and compounds
        2. atoms and molecules
        3. chemical shorthand notation
    B. Biologic
        1. complex molecule to the cell
        2. organism to population

Source materials for these topics is found in:

> Johnsen, Russel H. and Grunwald, Ernest, *Atoms, Molecules, and Chemical Change*, (third edition; New Jersey: Prentice-Hall, 1971), pp. 29-39; pp. 159-177; pp. 207-264.

Kieffer, William F., Chemistry Today, (Canfield Press, 1976), pp. 43-45; pp. 131-179; pp. 187-205.

Nebergall, William H. et al, College Chemistry with Qualitative Analysis, (Lexington, Massachusetts: D.C. Heath and Company, 1976), pp. 6-9; pp. 23-33.

Becket, George C., Introductory Concepts of Biology, (New York: Macmillan Company, 1972), pp. 1-29; pp. 169-184; pp. 215-236.

II. Forms and Properties of Matter
    A. Solid Form
        1. properties
        2. macroscopic and microscopic aspects
    B. Liquid Form
        1. properties

Source materials for these topics are:

Nebergall, William H. et al, College Chemistry with Qualitative Analysis, (Lexington, Massachusetts: D.C. Heath and Company, 1976), pp. 217-243.

Kieffer, William F., Chemistry Today, (Canfield Press, 1976), pp. 314-267.

III. Realm of Ecology
    A. General considerations
        1. ecosystems - their nature
        2. terrestrial ecosystems
        3. man's impact on ecosystems

Source materials for this topic:

Ehrlich, Paul et al, Human Ecology, (California: W.H. Freeman and Company, 1973), pp. 151-204.

Kormandy, Edward J., Concepts of Ecology, (New Jersey: Prentice-Hall, 1976), pp. 1-9; pp. 133-187; pp. 190-205.

Ehrlich, Paul R. and Ehrlich, Anne H., Population, Resources, Environment, (California: W.H. Freeman and Company, 1972), pp. 193-254.

Odum, Howard T., Ten Classroom Sessions in Ecology and Environment: Readings for Teachers, (Ivany, J.W., editor; 1972), pp. 240-252.

IV. Hydrosphere
    A. Water
        1. properties of water
        2. hydrologic cycle
        3. water pollutants
        4. floods; their classification
        5. flood prediction; flood hazard map
        6. flood and urbanization; flood plain planning
        7. guidelines for reducing flood damage
        8. hydrologic implications of waste disposal

Source materials for this section:

McKenzie, Gary D. and Utgard, Russell O., Man and His Physical Environment, (Minnesota: Burgess Publishing Company, 1975), pp. 40-61; pp. 125-157; pp. 305-321.

Tank, Ronald W., Focus on Environmental Geology, (New Jersey: Oxford University Press, 1973), pp. 192-206; pp. 244-270; pp. 385-392; pp. 412-440.

Cooke, R.U. and Doornkamp, J.C., Geomorphology in Environmental Management, (Clarendon Press, 1974), pp. 14-20; pp. 105-127.

Young, Keith, Geology: The Paradox of Earth and Man, (Massachusetts: Houghton Mifflin Company, 1975), pp. 101-135; pp. 295-329.

Nebergall, William H. et al, College Chemistry with Qualitative Analysis, (Lexington, Massachusetts: D.C. Heath and Company, 1976), pp. 245-270.

Boughey, Arthur S., Man and the Environment, (New York: Macmillan and Company, 1971), pp. 343-370.

Ehrlich, Paul R. et al, Human Ecology, (California: W.H. Freeman and Company, 1973), pp. 127-145.

Ehrlich, Paul R. and Ehrlich, Anne H., Population, Resources and Environment, (California: W.H. Freeman and Company, 1972), pp. 157-170.

Kormandy, Edward J., Concepts of Ecology, (New Jersey: Prentice-Hall, 1976), pp. 42-47.

V. Atmosphere
    A. Composition and modification
        1. composition

2. pollution
3. some solutions to air pollution problems

Source materials for this topic:

Nebergall, William H. et al, College Chemistry with Qualitative Analysis, ((Lexington, Massachusetts: D.C. Heath and Company, 1976), pp. 591-601.

Ehrlich, Paul R. and Ehrlich, Anne H., Population, Resources and Environment, (California: W.H. Freeman and Company, 1972), pp. 146-156.

Ehrlich, Paul et al, Human Ecology, (California: W.H. Freeman and Company, 1973), pp. 115-127; pp. 193-200.

Boughey, Arthur S., Man and the Environment, (New York: Macmillan and Company, 1971), pp. 313-343.

VI. Properties of Rocks and Soils
  A. General statement
    1. the composition and structure of the upper part of the earth's crust
    2. classification of rocks and soils
    3. specific engineering properties

Source materials for this topic are:

Flawn, Peter T., Environmental Geology, (New York: Harper and Row, 1970), pp. 1-18; pp. 63-80.

McKenzie, Pettyjohn, and Utgard, Investigations in Environmental Geoscience, (Minnesota: Burgess Publishing Company, 1975), pp. 1-15.

Romey, William D. et al, Investigations in Geology, (Dubuque, Iowa: W.C. Brown Company, 1967), pp. 13-18; pp. 37-47; pp. 135-156.

VII. Earth Resources
  A. General statement on resources and land use
    1. high value resources
    2. low value resources
    3. regional water plans
    4. course consequence of resource extraction

Source materials for this topic:

Flawn, Peter T., Environmental Geology, (New York: Harper and Row, 1970), pp. 81-117; pp. 162-177.

Tank, Ronald W., Focus on Environmental Geology, (Fairlawn, New Jersey: Oxford University Press, 1973), pp. 441-453.

B. Ground subsidence
   1. subsidence due to withdrawal of fluids
   2. subsidence arising from irrigation or land drainage
   3. other causes for subsidence
   4. problems of subsidence in urban and populated areas

Source materials for this topic:

Cooke, R.U. and Doornkamp, J.C., Geomorphology in Environmental Management, (Clarendon Press, 1974), pp. 167-186.

McKenzie, Gary D. and Utgard, Russell O., Man and His Physical Environment, (Minnesota: Burgess Publishing Company, 1975), pp. 76-95.

Young, Keith, Geology: The Paradox of Earth and Man, (Massachusetts: Houghton Mifflin Company, 1975), pp. 281-287.

Tank, Ronald W., Focus on Environmental Geology, (New Jersey: Oxford University Press, 1973), pp. 335-351.

C. Coastal problems
   1. a land unit approach to the study of coastal areas
   2. human interference in the coastal system

Source materials for this topic:

Cooke, R.U. and Doornkamp, J.C., Geomorphology in Environmental Management, (Clarendon Press, 1974), pp. 206-221.

X. Geology and Land Use -- Application of Environmental Data
   A. General statement
      1. study geologic maps and geomorphic maps
      2. accumulation, storage, and retrieval of environmental data
      3. the environmental impact statement

Young, Keith, Geology: The Paradox of Earth and Man, (Massachusetts: Houghton Mifflin Company, 1975), pp. 361-386.

Cooke, R.U. and Doornkamp, J.C., Geomorphology in Environmental Management, (Clarendon Press, 1974), pp. 308-323; pp. 352-379.

VIII. Endogenic Earth Processes
- A. Earthquakes
  1. hazard - general
  2. lessons learned from the study of earthquakes in populated areas
  3. earthquake prediction
  4. construction in earthquake areas

Source materials for this topic are found in:

Tank, Ronald W., *Focus on Environmental Geology*, (New Jersey: Oxford University Press, 1973), pp. 66-75; pp. 90-108.

McKenzie, Gary D. and Utgard, Russell O., *Man and His Physical Environment*, (Minnesota: Burgess Publishing Company, 1975), pp. 26-35.

Young, Keith, *Geology: The Paradox of Earth and Man*, (Massachusetts: Houghton Mifflin Company, 1975), pp. 217-244.

McKenzie, Pettyjohn, and Utgard, *Investigations in Environmental Geoscience*, (Minnesota: Burgess Publishing Company, 1975), pp. 25-34.

IX. Surficial Processes
- A. Mass movement
  1. landslides
  2. mud flows and other movements on slopes
  3. stabilizing mass movements

Source materials for this topic:

Tank, Ronald W., *Focus on Environmental Geology*, (New Jersey: Oxford University Press, 1973), pp. 138-153.

Young, Keith, *Geology: The Paradox of Earth and Man*, (Massachusetts: Houghton Mifflin Company, 1975), pp. 269-281.

Cooke, R.U. and Doornkamp, J.C., *Geomorphology in Environmental Management*, (Clarendon Press, 1974), pp. 128-166.

McKenzie, Gary D. and Utgard, Russell O., *Man and His Physical Environment*, (Minnesota: Burgess Publishing Company, 1975), pp. 61-76.

McKenzie, Pettyjohn, and Utgard, *Investigations in Environmental Geoscience*, (Minnesota: Burgess Publishing Company, 1975), pp. 35-44; pp. 53-66.

McKenzie, Gary D. and Utgard, Russell O., Man and His Physical Environment, (Minnesota: Burgess Publishing Company, 1975), pp. 287-302; pp. 313-320; pp. 371-373.

Committee on Environmental and Public Policy, "Geologic Constraints in the Urban Environment," Geological Society of America, (1976).

McKenzie, Pettyjohn, and Utgard, Investigations in Environmental Geoscience, (Minnesota: Burgess Publishing Company, 1975), pp. 155-171.

STUDENT READING LIST

Students should be assigned readings from the source material listed under each major topic. One of the main objectives of this natural science element is to familiarize students with the complexity of the total environment. With this objective in mind, the most productive or efficient way to cover the material would be to have one specific reading list with which the instructor has great familiarity, and aspects of which the instructor can fully explain. (This would not be totally possible if two sets of reading material are compiled; one for the instructor and another for the student.)

A general reading list is compiled below which may be of interest to both the students and the instructors.

McHarg, I., Design with Nature, (New York: Doubleday, 1969).

Odum, E.P., Fundamentals of Ecology, (third edition; Pennsylvania: W.B. Saunders, 1971).

Goodman, Robert, After the Planners, (New York: Simon and Shuster, 1971).

Helfrich, Harold W., Jr. (ed), *The Environmental Crisis: Man's Struggle to Live with Himself*, (Connecticut: Yale University Press, 1970).

National Academy of Sciences, *Symposium on Aid and Threats to Society from Technology*: Proceedings National Academy of Sciences, 67, (1970), pp. 857-915.

Amir, Shaul, "Highway Location and Public Opposition," *Environment and Behavior*, Volume 4, (1972), pp. 413-436.

Utton, Albert E. and Henning, Daniel H., *Environmental Policy: Concepts and International Implications*, (New York: Praeger Publishers, 1973).

National Academy of Sciences, *The Earth and Human Affairs*, (Canfield Press, 1972).

INSTRUCTIONAL STRATEGIES

Topic I - IX

Lecture - recitation, with emphasis on case histories. Case studies should be discussed in great detail in order to emphasize the interplay of various determinants controlling the environment. A substantial part of the readings are built around case histories; it is felt that using these case studies is the most effective method of presenting the physio-biologic aspect of the environment.

Topic X

In addition to the above strategy, geologic maps from a selected area should be obtained (use geologic map of the local area) and information should be extracted from them, i.e., type of rock, soils, slope, attitude of the rocks, etc. The legend and scale should be explained.

AN INSTRUCTIONAL MODULE FOR BUILDING CODES: BUILDING INSPECTION

Dorothy Graham Packer-Fletcher
Building Officials & Code Administrators
International, Inc.

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

The objective of this course is to develop an understanding of the structure of performance codes and how these performance objectives are utilized by communities to promote the safety and habitability of structures. It is a further objective of this course to teach the urban technologist the basic skills needed by any individual involved with permit issuance, inspection and code enforcement.

INSTRUCTIONAL OUTLINE

I. Understanding the Building Code
  A. Introduction
    1. goals of code enforcement
    2. public service commitment
    3. discretionary enforcement
  B. What is a Building Code?
    1. governmental authority
    2. regulatory powers
    3. scope
    4. organization of code requirements
      a. articles and appendices
      b. sections, subsections, subdivisions
    5. definitions
  C. Determining Code Requirements
    1. performance objectives
    2. specification requirements
  D. Use of a Model Code
    1. objectives of model code
    2. adoption of code

Good coverage of these topics can be found in:

Sanderson, Richard L. (ed) *Readings in Code Administration*, Volume I, (Chicago: Building Officials and Code Administrators International, 1974), Chapters 1, 4, 5, 6, and 9.

For purposes of comparison see:

> BOCA Basic Building Code, (sixth edition; Chicago: Building Officials and Code Administrators International, 1975).
>
> One and Two Family Dwelling Code, 1975, (Danville, Illinois: American Insurance Association, Building Officials and Code Administrators International, Inc., International Conference of Building Officials and Southern Building Code Congress International, 1975).

II. Cornerstones of the Code

- A. Introduction
  - 1. what is a building?
  - 2. what is a structure?
- B. Use Groups
  - 1. occupancy
  - 2. fire hazard
  - 3. code references
- C. Type of Construction
  - 1. materials
  - 2. fireresistance
  - 3. fireresistance ratings
  - 4. four types of construction defined by code
    - a. fireproof
    - b. noncombustible
    - c. exterior masonry wall
    - d. frame
  - 5. protected and unprotected construction
- D. Combustibility, noncombustibility and fireresistance ratings
  - 1. definitions
  - 2. building elements
  - 3. building assemblies
- E. Table 305
  - 1. height and area limitations
  - 2. explaining the structure of the table
  - 3. exceptions to Table 305
- F. Table 214
  - 1. fireresistance ratings of building elements
  - 2. structure of the table
  - 3. notes to the table

Good coverage of these topics can be found in:

> Sanderson, Richard L. (ed), Readings in Code Administration, Volume I, (Chicago: Building Officials and Code Administrators International, 1974), Chapters 19, 24, and 30.

Reference materials applicable to these topics are:

Fireresistance Design Manual, 1975-76 Edition, (Gypsum Association, 1975).

Fire Resistance Index, January 1975 Edition, (Underwriters Laboratories, Inc., 1975).

III. The Zoning Ordinance
  A. Introduction
    1. what is zoning?
    2. benefits of zoning
    3. what zoning cannot do
  B. Adoption of a Zoning Ordinance
    1. governmental authority - municipal
    2. standard zoning enabling act
  C. Preparing the Zoning Ordinance
    1. drafting the text of the ordinance
    2. zoning map
    3. districts
    4. definitions
    5. nonconforming uses
    6. variances
    7. exceptions
  D. Administration
    1. determining costs for permits and fees
    2. functions of zoning inspector
  E. Zoning and the Public
    1. plan reviewing
    2. enforcement problems
    3. enforcement techniques
    4. handling zoning violations
    5. application to appeal

Additional coverage of administrative responsibilities can be found in:

Claiborne, Gaylon R. (ed), Administration of Building Regulations, (Chicago: Building Officials and Code Administrators International, 1973), Chapter 7.

Commentaries on zoning by various leading building officials may be investigated in:

Sanderson, Richard L. (ed), Readings in Code Administration, Volume I, (Chicago: Building Officials and Code Administrators International, 1974), Chapters 9, 15, 86, 87, 88, 89, and 90.

IV. Initiating the Permit Process
   A. Introduction
      1. working with the public
      2. filling out a permit application
      3. license to build
      4. permit fees
   B. Duties and Authority of Building Official
      1. mission of code enforcement agency
      2. new and existing construction
      3. information required on permit application
   C. Processing Permit Application
      1. validation
      2. code enforcement activities
   D. Computing Plan Review Fee
      1. reason for fees
      2. method for computation
      3. examples
   E. Computing the Building Permit Fee
      1. basis
      2. formula
      3. valuation tables
      4. volume
      5. cubic foot construction costs
      6. examples

Additional sources of information for administration responsibility can be found in:

> Claiborne, Gaylon R. (ed), *Administration of Building Regulations*, (Chicago: Building Officials and Code Administrators International, 1973), Chapters 1 and 2.
>
> Sanderson, Richard L. (ed), *Readings in Code Administration*, Volume I, (Chicago: Building Officials and Code Administrators International, 1974), Chapter 62.

V. Reviewing Plans and Specifications and Completing a Zoning Review
   A. Introduction
      1. definitions of terminology
      2. types of plans
   B. Zoning Review
      1. checking plot plan
      2. using zoning ordinance plan review form
      3. writing corrections list
      4. zoning review for larger projects
   C. Identifying Plans
      1. presentation of set of plans
      2. calculate missing dimensions

D. Reading Plans
   1. notes
   2. details
   3. sections
   4. schedules
   5. engineering details
   6. isometric drawings

Reference books for additional drawings and information:

Callender, John Hancock (ed), *Time Saver Standards for Architectural Design*, (New York: McGraw-Hill Book Company).

Ramsey, Charles and Sleeper, Harold, *Architectural Graphic Standards*, (New York: John Wiley & Son, Inc.).

IV. Building Code Review
   A. Introduction
      1. duties of plan reviewer
      2. approval of plans
   B. Plan Review Process
      1. checking for code conformance
      2. plan review record form and its use
      3. height and area computations
   C. Working with Table 305
      1. meaning of table
      2. notes to table and their application
   D. Means of Egress
      1. components
      2. definitions
      3. protected means of egress
   E. Occupancy Load
      1. maximum floor area allowance per occupant
      2. calculations
   F. Determining Required Capacity of Exitways
      1. units of egress width
      2. calculations
   G. Fireresistance Requirements
      1. how to check an assembly
      2. determining fireresistance ratings
      3. flamespread
      4. fire protection systems

For further information concerning the relationship of plan exam to conformance of work done on the job, see:

Sanderson, Richard L. (ed), *Readings in Code Administration*, Volume 3, (Chicago: Building Officials and Code Administrators International, 1974), Chapter 8.

PAGE 8 OF THE MODULE "AN INSTRUCTIONAL MODULE FOR BUILDING CODES: BUILDING INSPECTION" MISSING FROM DOCUMENT PRIOR TO ITS BEING SHIPPED TO EDRS FOR FILMING.

VII. Construction Materials
    A. Introduction
        1. statics
            a. loading conditions
            b. math review
    B. Strength of Materials
        1. wood
        2. concrete
        3. steel
    C. Architectural Structural Representation
        1. symbols
        2. abbreviations
        3. blueprints
    D. Foundation
        1. field identification of soil supports
        2. types of soil
        3. properties
        4. identify soil support problems
    E. Foundation Support Systems
        1. concrete and mixes of concrete
        2. typical tests in field
            a. slump test
            b. cylinder test
        3. concrete reinforcement nomenclature
        4. placing, curing of concrete
    F. Field Inspection of Concrete
        1. falsework and framing
        2. placing reinforced steel
        3. placing concrete
    G. Steel Structures
        1. plumb and grade of anchor bolts
        2. plates
        3. columns, beams, girders
        4. rivets, bolts, rivet hole alignment
        5. guying
        6. derrick capacity
        7. cable and wire rope
    H. Wood Structures
        1. footings
        2. waterproofing
        3. mechanical properties of wood
        4. wood classification
        5. measurement grading
        6. wall, room framing
        7. exterior finish
        8. interior finish
        9. fire protection
        10. specifications

For further reference, good sources of information include:

Seelye, E. E., *Data Book for Civil Engineers, Field Practice*, (New York: John Wiley & Sons, Inc.).

STUDENT READING LIST

I. Understanding the Building Code

Specific coverage of code requirements and model codes can be found in:

> Sanderson, Richard L., Codes and Code Administration, (Chicago: Building Officials and Code Administrators International, 1969), pp. 5-20, 37-50.

II. Cornerstones of the Code

Capsule information on these topics can be found in:

> Sanderson, Richard L., Perspectives for Code Administrators, (Chicago: Building Officials and Code Administrators International, 1974), pp. 48-52, 60-61, 70-74.

III. The Zoning Ordinance

An excellent overview of zoning is presented in:

> Rody, Martin J. and Smith, Herbert H., Zoning Primer, (New Jersey: Chandler-Davis Publishing Company, 1973).

IV. Initiating the Permit Process

Additional information on office procedures and the role of official vs. public can be found in:

> Codes and Code Administration, pp. 139-147.

V. Reviewing Plans and Specifications and Completing a Zoning Review

A very useful reference tool for students can be found in:

> Hornung, William J., Architectural Drafting, (New Jersey: Prentice-Hall, Inc., 1971).

VI. Building Code Review

Capsule coverage of plan review essentials are explored in:

Sanderson, Richard L., *Readings in Code Administration*, Volume 3, (Chicago: Building Officials and Code Administrators International, 1974), Chapter 7.

VII. Construction Materials

Essentials of Soil-Cement Construction, Inspection, Field Control, (Chicago: Portland Cement Association).

Another source book on soil mechanics is:

Tschebortarioff, *Soil Mechanics Foundations and Earth Structures*, (New York: McGraw-Hill Book Company).

The remainder of the course will deal with the inspection of one and two-family dwellings stressing the actual inspection activities as well as report writing skills.

INSTRUCTIONAL STRATEGIES

Due to the extensive length of the instructional outline, I will select *five* major headings to explore which will present an appropriate method of instructional presentation.

I. Understanding the Building Code
   C. Determining Code Requirements

The best method of presentation for this area of study is to select various portions of the code for the student. Listing these code requirements will show the differences between performance objectives and specifications. The student should then identify which code sections are which. Then, he should state why he believes the code section is written as a performance-oriented regulation or a specification requirement.

EXAMPLE

----Projections necessary for safety: In any specific application, the building official may designate by approved rules such architectural features and accessories which are deemed desirable or necessary for the health or safety of the public and the extent to which they may project beyond the street lot line or the building line where such is established by statute, subject to all provisions and restrictions that may be otherwise prescribed by law, ordinance or rule of the authorities having jurisdiction over streets or public spaces.

----Equipment requiring servicing shall be accessible by means of a passageway 2 feet by 6 feet 6 inches minimum. Exception: An access opening to the attic or underfloor area may be reduced to a 30-inch dimension provided the equipment can be replaced.

Equipment shall be provided with an unobstructed space 30 inches by 6 feet 6 inches minimum on the service side. Exception: The height of the working space may be reduced to 30 inches for an air handling unit, air filter or refrigerant and brine control valves. Fan coils in drop ceilings may be serviced through combination return air grills.

----The building official may in his discretion give temporary permission for a reasonable time to supply and use current in part of an electric installation before such installation has been fully completed and the final certificate of approval has been issued; provided that the part covered by the temporary certificate complies with all the requirements specified for temporary lighting, heat or power in the National Electrical Code.

II. Cornerstones of the Code
F. Table 214

Understanding fireresistance ratings and their importance to the public health, safety and welfare is best explained in a classroom presentation involving an overhead projector. The instructor should show the students Table 214 and explain the background of the table and the notes to the table. While explaining this, the instructor should give examples of various assemblies and show the student how to use the Fireresistance Design Manual published by Gypsum Association and the manual published by Underwriters Laboratories. Then, the student should be given a problem to solve.

SAMPLE

First, look at Table 214. If you had to check the fireresistance rating of an interior bearing wall composed of noncombustible materials of Type 3-A construction, what would be the fireresistance rating in number of hours?

Refer to both Tables 214 and 902 (see Note e). You have to check the plans for fire separation walls composed of metal studs and gypsum wallboard. The architect has indicated on the plans that the test number for this design is UL R1319-31, 32, Design 11-2 or U411, 6-2-60. Find this assembly in the Gypsum Association's Fire Resistance Design Manual, 1975-76 Edition. The building has been classified as Use Group A-1 and Construction Type 2-A. Considering all of this information, state whether this assembly conforms to code requirements. If it does not conform, what section of the code does it violate? And, if this assembly does not conform, what would you tell the designer to do to make it conform to the code?

III. The Zoning Ordinance

E. Zoning and the Public

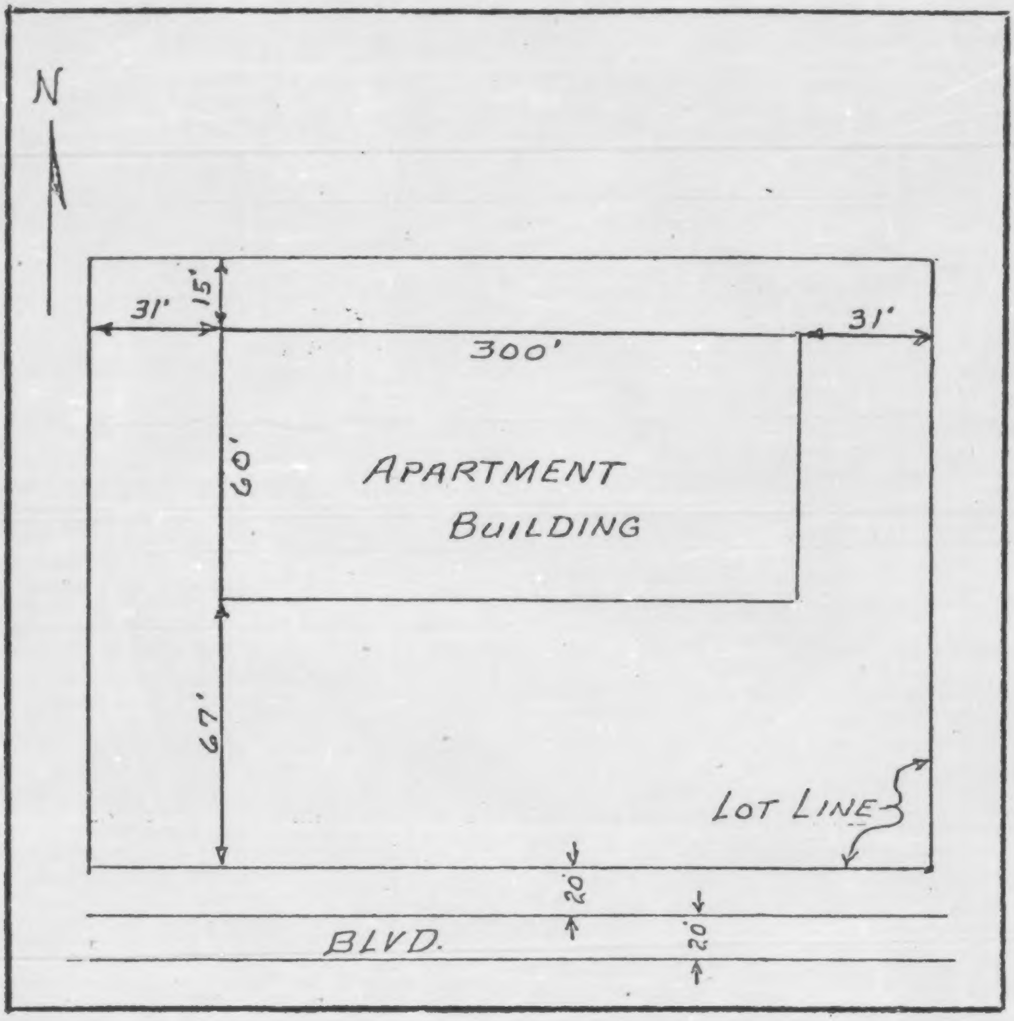
One of the best approaches to the problem of the public official relating to the public is to do role playing in the classroom. First, have your students familiarize themselves with selected portions of your municipality's zoning ordinance. Then, set up a situation where one student plays the role of the zoning inspector/ urban technologist, and another individual plays the role of the uncooperative John Q. Public.

SAMPLE

The municipal zoning ordinance states that no individual can operate a business in his home in any district zoned R-1. A complaint has been filed against John Smith who is conducting a bookcase assembly shop in his basement. He is sawing and making noise, dumping large amounts of garbage and blocking traffic with his delivery truck.

SAMPLE

Study the plot plan. Based on the following information, calculate the height and area for this apartment building. Then, complete the plan review record form for this computation. Finally, check code compliance, marking the height and area "OK" if they comply with code requirements.


N
31'
15'
300'
31'
60'
APARTMENT
BUILDING
67'
LOT LINE
20'
BLVD.
20'

6

MODULE: BUILDING CODES (cont'd.)

HEIGHT & AREA COMPUTATIONS
(Articles 2 & 3 & Table 305)

se group lassification ______________________ (202.0 — 213.0)

Bldg. ht. ______________ story feet

Allow. Bldg. ht. ______________ story feet

in. type of const. based on ht. & area ______________________ (214.0 — 218.0)

llow. tab. area (Tbl-305) ☐ s.f.

eduction for ht. (Tbl-305.4) ☐ s.f.

Reduced allow. area → ☐ s.f.

rontage incr. (306.2) ☐ s.f. ←

Sprinkler incr. (306.3) ☐ s.f.

Total area increases → ☐ s.f.

Open space (306.2) ______ North ______ East ______ West ______ South

Perimeter ______________ ft. Open perim. ______________ ft.

% Open perimeter = ______________________ Open perim./perim.

% Tab. area increase (306.2) = ______________________ 2x (% Open perim. –25%)

llow. area per floor ______________________ s.f.

Actual bldg. area per floor ______________________ s.

Caution: Max. area may not exceed 3½ times the tab area. (306.5)

NOTES: N.R. — Not required
N.A. — Not applicable

METHODS OF EVALUATION

There are several methods which are applicable to this course of study. Since the stress is placed upon actual skills, it is advisable to concentrate testing or evaluation on specific skills the urban technologist will need to work with the building department.

Project #1: Students should be grouped into anywhere from two to four students in a group. These students should then be assigned the task of stating how they would set up a building department. They should use their own community as the city or town where this building department is needed. What code would they adopt? How would they adopt a code? What kinds of staffing would be needed?

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The report written by the students should cover all topics included in the course itself. Their building department should be able to protect the health, safety and welfare of the community. And, they should clearly state how they would train personnel, e.g., inspectors, clerks, zoning inspectors, plan reviewers, and building officials to understand how to do their jobs and how to work with the community. Since the urban technologist degree is designed to promote cooperation between municipal government agencies, this part of the project should be very important to successful completion of the course of study.

Project #2: This project should be done on an individual basis. Each student should be required to inspect both new construction and existing construction. He or she should be taken to the construction site of a single family dwelling and asked to conduct the inspection. If there are any violations, they should note the violations and write a report. If there are no violations, they should be given a list of five prepared violations and asked to write a report.

Then the student should be asked to inspect existing construction, such as a school, and write an inspection report.

These two projects will test nearly all the skills acquired in this course in terms of procedures, functions, activities, and all phases of code enforcement as this area of study relates to the urban technologist degree program.

Project #1 Instructor's Analysis: When evaluating the performance of a group project, the instructor should be looking for several items including:

1. Structure of building department
2. Understanding of use of codes
3. Legal implications of code enforcement
4. Establishment of workable zoning principles
5. Procedures for all office work
6. Permit issuance process detailed
7. Plan review organized
8. Fee schedules determined
9. Inspection procedures defined
10. Reports organized by category and use

Project #2 Instructor's Analysis: When evaluating the individual's performance on inspection and report writing, the instructor should be looking for several items, including:

1. Knowledge of basic construction
2. Ability to compare work done to approved plans for code conformance
3. Ability to talk to contractor, builder or any other points of public contact
4. Ability to recognize violations
5. Ability to tell the instructor what he is looking at and why he is checking each particular item
6. Ability to write an inspection report
7. Ability to write a violation notice
8. Ability to write any other required reports
9. The instructor is looking for a student who can perform these tasks according to the skills he has learned in this course

AN INSTRUCTIONAL MODULE FOR PUBLIC SYSTEMS DEVELOPMENT AND FACILITIES

Ralph G. Crum
Youngstown State University

URBAN TECHNOLOGY DEVELOPMENT PROGRAM
Youngstown State University

Supported by a grant from the National Science Foundation

FOREWARD

This series of modules has been designed to serve as a guide in the development of an Urban Technology Curriculum. The modules are an outgrowth of an extensive skills and needs survey of public and private organizations in the fields of planning and public works. Modules are an outline for a course of instruction designed to teach students the relevant and practical skills and techniques that are required in the daily operation of planning and public works related organizations.

These modules are developed, printed, and distributed by the Urban Technology Development Program under the auspices of the Center for Urban Studies for Youngstown State University with National Science Foundation support.

STATEMENT OF OBJECTIVES

The major objective of this module is to provide a practicum element in the urban technologist program in Public Systems Development and Facilities. This objective is threefold in nature:

1. To provide education in public works for engineering and engineering technology students with considerable technical background
2. To provide an indepth overview of public works engineering to urban technology students primarily interested in planning
3. To provide a general overview of public works to generalist urban technologists and persons from other areas with urban interests

The companion practicum module "Public Planning Development Practices Module"serves a parallel function in the planning rather than the development area.

INSTRUCTIONAL OUTLINE

I. Societal
   A. Social Context
      1. history
      2. government
      3. management
   B. Management
      1. theory of organization and management
      2. decision making
      3. organizational forms
   C. Public Relations
      1. serving public
      2. contracting media
      3. programs
   D. Personnel Administration
      1. functions of personnel

II. Financial
    A. Public Works Finance
        1. sources
        2. borrowing
        3. budgeting
        4. accounting
    B. Purchasing
        1. organizing and managing
        2. purchasing process

III. Building and Grounds
    A. Physical Plant Management
    B. Maintenance
    C. Records and Finance

IV. Equipment Management

V. Engineering Management
    A. Function
    B. Contracting
    C. Design
    D. Inspection

VI. Streets and Transportation
    A. Utilities
    B. Surfacing
    C. Maintenance
    D. Bridges
    E. Traffic Studies and Records
    F. Operations
    G. Lighting
    H. Cleaning and Snow Removal

VII. Airports
    A. Classes
    B. Ownership
    C. Financing
    D. Community Factors

VIII. Drainage and Flood Control
    A. Responsibilities
    B. Detention and Retention
    C. Planning
    D. Plan Implementation
    E. Quality Considerations
    F. Data Analysis

IX. Potable Water
    A. Planning Water Systems
    B. Operations
    C. Budgeting and Finances

X. Wastewater Collection, Treatment Disposal
   A. Origins
   B. Collection Systems
   C. Treatment and Disposal
   D. Reclamation and Reuse
   E. Operations and Maintenance

XI. Solid Waste
   A. Collection Systems
   B. Processing
   C. Resource Recovery
   D. Disposal

XII. Air Pollution
   A. Theory
   B. Sources
   C. Standards
   D. Planning
   E. Control

XIII. Code Enforcement
   A. Methods
   B. Codes and Standards
   C. Inspections
   D. Violations

Instructional Strategy

This course or series of courses depending on the level of desire of involvment by individual students is at the upper or final level in the curriculum. Basic courses in mathematics, data systems, environmental sciences and public administration are prerequisites. The first course in the series may be general but the remainder are topic specific and application oriented. The actual work functions of a Public Works department will be duplicated. Specific skills as identified by Public Works Departments in the skills survey will be covered in detail.

Methods of Evaluation

Since most of the courses will emphasize actual work functions. The main method of evaluation will be to require individual students and small groups of students to complete representative "real" problems requiring the usage of the principals and skills developed in the courses. "Total" situations will be emphasized with students often required to discover the problem sets involved before outlining related methods of solution.

SECTION VI

COURSE MATERIAL TESTING

Task VI of the project includes Course Material Testing. The staff has been actively involved in testing instructional materials and strategies related to the project.

Drs. Stephens and Redburn offered a course in computers for planners through the University's Continuing Education Division. Eighteen local and area planners participated in this five-week course, which was developed under the project. Two areas of computer use were covered in the course. The application of computer mapping to planning problems and the use of SPSS to process and analyze planning data. The instructional materials developed by the staff for this course were evaluated in a very favorable manner by the participants in the course.

Drs. Stephens and Crum completed two courses where they tested other materials and strategies related to the project. In Dr. Stephens' course on City and Regional Planning, students completed an exercize in land use data collection and analysis. These students also utilized CLUG, a simulation exercise, to analyze the effectiveness of a zoning ordinance. Dr. Crum's course in Architectural Technology allowed students to use concepts of building material and code requirements in an actual apartment complex. The architects on the project participated directly in the instruction of the course.

These two courses have been in existence at YSU for specific groups of students and we have determined that they can be broadened and revitalized for use by Urban Technology students.

Many of our educational advisory committee members reminded us that adoption of an Urban Technologist Program in various universities would require compromises with the ideal curriculum to accomodate local university courses and policies on new courses. Our results here indicate that existing courses can be altered and adopted for broader uses if those responsible for the courses desire to do so. Along these lines, Dr. Stephens of our project staff, offered some of the materials developed in his project as a part of a graduate planning class at the University of Akron.

Other Activities

The Center for Urban Studies at YSU, under the direction of Dr. Redburn, offered a zoning seminar for local government officials and interested citizens. The event drew over one-hundred participants from a five-county area in northeast Ohio and provided useful input to our curriculum development process.

As indicated in previous progress reporting a one-year certificate program in Urban Technology has already been implemented on campus. Two new courses for this program as well as other Urban Programs to be implemented and for geography students have been approved for offering. These courses are Geography 731, Introduction to Cartography and Geography 813, Field Methods. Below are the course descriptions:

> Introduction to Cartography: Techniques and practical training in compilation, design, and drafting of maps, including computer mapping techniques.

Field Methods: Practical experiences in geographic data collection. Emphasis is on applying the techniques of observation, sampling, interviewing, and ampping to both physical and human phenomena having geographical dimensions. Students will apply these techniques at several scales: The local campus, the Youngstown-Warren SMSA, a larger metropolitan region, and other nearby regions. Participation in field trips is mandatory.

They are designed to provide training in three of the specific areas identified as core elements in the curriculum. The three are mapping and graphic, data generation and interpretation - planning and data generation and interpretation - public works.

Another new course at YSU which will embody concepts of an Urban Technologist is Economics 822, Urban Economics.

During the following academic year, the following two courses in Civil Engineering Technology will be completely revised providing a testing laboratory for the systems development and facilities element of the Urban Technologist Curriculum. These are:

CET 724 - Public Works Technology

CET 712 - Architectural Technology

Two new Civil Engineering Technology courses are being developed for the Urban Technologist. These are:

CET 722 - Urban Technology Problems. Data analysis techniques in Urban problems such as water supply and waste quantities, transportation, traffic and other public works activities. Elementary statistical techniques for data collection and analysis. Development of models for transportation and land use planning. Prereq.: Math 502 and CET 624 or Geog. 726.

CET 728 - Industrial Pollution Control. An applied course for engineering technology students or environmental planning oriented students in other departments. Principles and devices available for industrial pollution control.

SECTION VII
REVIEW AND EVALUATION

Two levels of nationally-based committees were established to assist with development, review and evaluation of educational materials. These are:

1. Educational Advisory Committee, a committee composed of educators in requisite fields, and
2. Steering and Review Committee, a committee composed of the above persons plus consultants and advisors from several agencies and associations relating to the project.

The committee members are shown in Tables and

Although continued use of some committee members was made during the project, major use of committees was made as follows:

1. Individual meetings. As the project was initiated, meetings were held with all committee members individually to orient them to the concept of the urban technologist and to ask that they gather special materials together for the Technical Skills Conference.

2. Technical Skills Conference. On September 5, 1975 a major review and evaluation meeting was held on the Youngstown State University campus. All members of the Steering and Review Committee and all project team members were present. Also attending were the YSU Dean's of Schools related to the project and a member of the YSU Board of Trustees. A draft version of the concept of the Urban Planning Technologist and a draft version of a Skills Survey had been discussed with each participant previously and each was asked to make an oral presentaiton of their critique of each. The meeting lasted one full day and was tape recorded. Figure 1 shows some of the participants. Figure 2 shows Michael Klasovsky, (L) agency coordinator for the study and Israel Stollman, (C) Executive Director, American Society of Planning Officials being interviewed by a television newsman. The results of the conference which can be summarized as follows were borne out by subsequent investigations and form critical bases for the Urban Technologist concept and curriculum elements.

1. There is general need for this person. (the Technologist)
2. This person should not be a new type planner.
3. This person should not be a paraprofessional to the planner.
4. This person should not be a paraprofessional to any professional. There is a definite need; we should detail that need and promote a product to fill it.
5. The word "Planning" should probably be dropped from this person's name, leaving "Urban Technologist."

6. The Universities involved could provide source materials and help test educational concepts.

7. The agencies involved would cooperate by providing source materials and in obtaining addresses for and promotion of the Skills Survey.

8. The Skills Survey should probably not attempt to identify the Urban Technologist and to determine respondee's concept for need. The survey should rather attempt to find out what agency or firm considers important skills to their function and for which they have most need.

9. Private firms should find much need for this person. He should have specific skills but should be flexible as skill requirements change with jobs in progress.

10. Curriculum elements should be developed which allow flexibility for adoption into formats dictated by the situations existing at various universities interested.

11. Don't restrict curriculum to a two-year technical program. Develop the curriculum elements and course modules as needed and disseminate the results to the educational field when completed.

12. Provide a program for those with lesser capabilities also. There are useful jobs in the area for the under-educated.

3. Curricular Advice. As curriculum elements and instructional modules were outlined, various members of the Educational Advisory Committee helped review these. Additional members of the staffs at Akron University, University of Nebraska and Arizona State made advisory comments through our Educational Advisory Committee members at those institutions.

4. Review Conference and Western Seminar. On June 12, 1976, a seminar was held on the cmapus of the University of Nebraska, Lincoln, Nebraska. With the assistance of Dr. Dean Rugg, regional agency staff members were invited to a review of the concept of the Urban Technologist. June 12 and 13 were then devoted to all-day review sessions by our Advisory Committee on curricula elements and modules. A list of experts in each area was drawn as potential instructional module authors. June 14 and 15 were devoted to meetings in the national headquarters (Chicago) of the American Society of Planning Officials and the American Public Works Association. These two organizations relate to the majority of the agencies which would hire the Urban Technologist. Messers Israel Stollman and Frank So of ASPO and Mr. Malcolm Van Deursen of APWA, members of our steering/review committee, were brought up to date and their comments received.

5. Consultants. Several of our advisory committee members have become directly associated with the project as a natural extension of their advisory capacity. Dr. Costa and staff members at Akron State have taken on the task of outlining instructional modules in Public Planning policies, Mapping and Graphics, and Formal Communications; Dr. Saltzman and staff members at Cornell have taken on the task of outlining modules in Quantitative Methods, Planning Law & Controls, and Primary Data Collection.

URBAN PLANNING TECHNOLOGIST PROGRAM

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6. Skills Survey and Dissemination of Materials. Perhaps the most useful function of our advisors and consultants was in providing name lists of pertinent persons, agencies and firms to receive our Skills Survey and to whom to disseminate materials on the Urban Technologist Concepts. Several tens of thousands of names have been provided which would have been otherwise difficult to obtain. Our advisors and consultants also produced a valuable service by contributing a cover letter to the survey. For example, surveys sent to agencies in Arizona contained a cover letter from Arizona state indicating their participation in the study and soliciting response. Another example was a similar cover letter from the American Public Works Association in those surveys sent to APWA members. This assistance by our advisors and consultants proved to be a major factor in obtaining responses to the survey.

In summary, it can be said that the project benefited to a very large degree through our advisors and consultants. Most of their help was received free of charge or for a very modest honorarium. It is clear that the sponsorship of the National Science Foundation was largely responsible for the excellent participation of so many individuals and groups. The result of this nationally-based review participation has been a significant improvement in the Urban Technologist concept and the funds spent on this review have been returned several-fold. We on this project staff heartily endorse the concept of national review committees.

SECTION VIII

DISSEMINATION OF RESULTS

Dissemination of results of this project are as follows:

1. Formal written report - this document. Copies of this report have been distributed to several universities and agencies requesting them. A limited number of additional copies are available to interested parties.
2. Skills Survey for the Urban Technologist. A detailed report on the results of the survey of several hundred agencies, consultants and firms in Urban planning and development areas. This survey summary has been sent to about 300 agencies requesting it. Additional copies are available upon request and further copies will be sent as part of Phase II of the Urban Technologist Program.
3. The Urban Technologist Concept. A booklet describing the rationale for the Urban Technologist Concept, summarizing survey and advisory committee inputs to skills and curricula and outlining curricula elements and instrucitonal modules. 1000 booklets have been printed. This booklet will be the main method of dissemination of project results. About 500 have been distributed to date and more will be distributed.

All requests for project materials should be addressed to:

Dr. Ralph G. Crum
Engineering Technology Department
Youngstown State University
Youngstown, Ohio 44555

APPENDIX A

URBAN TECHNOLOGY RELATED PROGRAMS
AT YOUNGSTOWN STATE

PAMPHLET ON URBAN TECHNOLOGY AT YOUNGSTOWN STATE
REMOVED DUE TO MARGINAL LEGIBILITY

APPENDIX B SURVEY PRETEST

Please use the prepaid return envelope to return this questionnaire to: Center for Urban Studies, Youngstown State University, Youngstown, Ohio 44555.

The major purpose of this questionnaire is to determine your need for college-trained planning technicians with skills that will support those of the professional planner. A second purpose is to relate these needs to the nature of your department, firm or agency.

☐ Check here if you would like to receive a statistical summary of the questionnaire results.

_____ How large is the total staff of your department, firm or agency?

_____ How many professional planners are currently on the staff of your department, firm or agency?

_____ How many of these planners are trained at the master's degree level or beyond?

_____ How many college-trained engineers are on your staff?

_____ How many of your professional staff can program a computer using FORTRAN, COBOL, or a comparable language?

_____ How many of your professional staff can apply statistical analysis techniques such as correlation and multiple regression analysis to the study of a problem?

_____ How many of your professional staff can perform a formal cost-effectiveness analysis of alternative programs?

How significant is the time devoted by your planning department or agency to each of the following types of planning activities?

	Time of Major Significance		Time of Moderate Significance		Time Not Significant
comprehensive planning	1	2	3	4	5
community development planning(CDA)	1	2	3	4	5
model cities planning	1	2	3	4	5
environmental and land use planning	1	2	3	4	5
social services planning	1	2	3	4	5
housing analyses	1	2	3	4	5
advocacy planning	1	2	3	4	5
planning assistance to neighborhood organizations	1	2	3	4	5
designing public works projects	1	2	3	4	5

In the space below, please suggest changes in or additions to the categories listed on the preceding page. Strike out or write over any items in the list you would eliminate or reword.

How significant is the time devoted to each of the following types of work in your agency, firm, or department?

	Time of Major Significance		Time of Moderate Significance		Time Not Significant
preparing federal and state applications	1	2	3	4	5
data collection	1	2	3	4	5
development and testing of computerized models	1	2	3	4	5
drafting	1	2	3	4	5
updating tax, zoning, and land use maps	1	2	3	4	5
creating in-house designs for public facilities or publicly-supported projects	1	2	3	4	5
supervising contracts for planning or design work by consultant firms	1	2	3	4	5

In the space below, please suggest changes in or additions to the categories listed above. Strike out or write over any items in the list you would eliminate or reword.

Imagine that there is an immediate opening in your agency for a junior level professional staff person with 2 or 4 years of college. The following is a list of skills that this person might possess. For each one, please circle a number indicating how important it would be for this person to have this skill, if he were starting work in your shop today.

1 = Essential
2 = Very Desirable
3 = Desirable
4 = Possibly Useful
5 = Not Important

This person should be able to:	Essential		Desirable		Not Important
....conduct a formal telephone or personal interview	1	2	3	4	5
....design and pretest a questionnaire	1	2	3	4	5
....draw a representative sample of a known population	1	2	3	4	5
....develop a land use map	1	2	3	4	5
....develop a land capability map	1	2	3	4	5
....do plane table mapping	1	2	3	4	5
....interpret air photographs of land use	1	2	3	4	5
....interpret remote images	1	2	3	4	5
....read a topographic map	1	2	3	4	5
....read a blueprint	1	2	3	4	5
....take a soil sample	1	2	3	4	5
....analyze a soil sample	1	2	3	4	5
....take a traffic count	1	2	3	4	5
....measure hydrologic flows	1	2	3	4	5
....write a concise report of research findings	1	2	3	4	5
....do line drawings	1	2	3	4	5
....scribe a map	1	2	3	4	5
....program a computer graphics software package	1	2	3	4	5
....use a photo darkroom	1	2	3	4	5
....calculate measures of central tendency and statistical distribution	1	2	3	4	5
....calculate a correlation coefficient	1	2	3	4	5
....calculate a linear regression	1	2	3	4	5
....interpret correlation coefficients and statistical significance	1	2	3	4	5
....interpret a linear regression equation	1	2	3	4	5
....develop and test an hypothesis	1	2	3	4	5
....interpret partial and multiple correlation coefficients	1	2	3	4	5

This person should be able to:	Essential		Desirable		Not Important
....interpret the results of a factor analysis	1	2	3	4	5
....interpret a network analysis	1	2	3	4	5
....interpret a cross tabulation of two variables	1	2	3	4	5
....analyze the results of a questionnaire or opinion survey	1	2	3	4	5
....use computer statistical packages(e.g.,SPSS,Biomed)	1	2	3	4	5
....develop and test an econometric or causal model of a complex system	1	2	3	4	5
....use a keypunch	1	2	3	4	5
....use a typewriter	1	2	3	4	5
....research without assistance a problem in planning law	1	2	3	4	5
....conduct a critical path analysis of a scheduling problem	1	2	3	4	5
....be familiar with the properties of various construction materials(e.g., insulation, plumbing)	1	2	3	4	5
....research zoning and subdivision regulations without assistance	1	2	3	4	5
....speak effectively to a professional group	1	2	3	4	5
....present a technical issue to elected officials	1	2	3	4	5
....organize an interagency task force	1	2	3	4	5
....work effectively with citizens groups	1	2	3	4	5
....work effectively with professionals of other agencies	1	2	3	4	5
....design research to evaluate the impact of a government program	1	2	3	4	5
....develop recommendations for changes in local or state law	1	2	3	4	5
....work effectively with racial minorities	1	2	3	4	5
....build a three-dimensional structural model	1	2	3	4	5
....use surveying instruments to lay out a site	1	2	3	4	5
....solve an algebraic equation	1	2	3	4	5
....use a programmable desk calculator	1	2	3	4	5
....take and analyze air samples	1	2	3	4	5
....take and analyze water samples	1	2	3	4	5

This person should be able to:	Essential		Desirable		Not Important
....calculate sewer flows	1	2	3	4	5
....lay out a sewer plan	1	2	3	4	5
....analyze traffic count data	1	2	3	4	5
....develop and test a simulation model for transportation or land use planning	1	2	3	4	5
....perform a cost-effectiveness analysis of alternative programs	1	2	3	4	5
....conduct an environmental impact analysis	1	2	3	4	5
....conduct a fire safety inspection of a house or building	1	2	3	4	5

Please indicate below the skills you would add to this list. Also, please suggest any changes in format. Scratch out or write over any items in the list that you would eliminate or reword.

Of the skills listed above, what three would you consider most important if today you were hiring a planning technician to support the professional planners in your department, firm, or agency?

1. ______________________________

2. ______________________________

3. ______________________________

Approximately how many college-trained planning technicians with appropriate skills would you anticipate your agency or department hiring on the average each year for the next 5 years?

__________(average number to be hired per year in next 5 years)

What would be the probable starting salary you could offer such a person?

$__________

The following questions deal with your own training and background.

Your education:

___ 0-8 years
___ some high school
___ high school graduate
___ some college
___ college graduate
___ some graduate work
___ master's degree
___ doctor's degree
___ other professional degree

In what field or specialty did you earn your highest degree?

____

In what professional groups do you maintain active membership?

How were you selected for your present position?

___ elected
___ appointed, non-civil service
___ appointed, civil service
___ other(please specify)

How would you rate the current effectiveness of your department firm,or agency in comparison with similar agencies in other communities? (Responses will be kept strictly confidential.)

___ outstanding; well above average
___ good; above average
___ average
___ fair; below average
___ poor; well below average

How would you rate the current staff morale of your department,firm or agency in comparison with similar agencies in other communities?

___ better than most
___ about the same as most
___ worse than most

....

Thank you for your cooperation. See page one for return address.

URBAN PLANNING TECHNOLOGIST DEVELOPMENT PROGRAM
URBAN STUDIES CENTER
YOUNGSTOWN STATE UNIVERSITY
YOUNGSTOWN, OHIO 44555

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APPENDIX C URBAN TECHNOLOGIST DEVELOPMENT PROGRAM
SURVEY INSTRUMENT

YOUNGSTOWN STATE UNIVERSITY
YOUNGSTOWN, OHIO 44503

Dear Respondent:

The National Science Foundation is sponsoring a program under the direction of Youngstown State University to develop model curricula and instructional units in Urban Technology. National planning and public works organizations as well as several universities are assisting in the program.

The Urban Technologist is to be a staff person with specialized technical skills trained to support professionals of agencies or firms engaged in some aspect of urban planning, engineering, or public works. Curricula will be developed to educate new staff members as well as to provide in-service training.

We seek your assistance in determining the specific skills most needed as support in your type of organization. Your responses will be analyzed to provide a basis for instructional development. All data will be grouped by category only, with no identification of individual sources.

We will be most grateful for your assistance and look forward to sharing with you the products of this effort.

Sincerely,

Ralph G. Crum
Dr. Ralph G. Crum
Project Director,
Urban Technologist
Development Program

RGC:sj

Note: To return this questionnaire, tear off this page and staple right-hand side of remaining pages.

URBAN PLANNING TECHNOLOGY SURVEY

The major purpose of this questionnaire is to determine your need for college-trained technicians with skills that will support those of the professional staff of your organization. A second purpose is to relate these needs to the nature of your organization.

☐ *Check here if you would like to receive a statistical summary of the questionnaire results.*

BACKGROUND INFORMATION ON YOUR ORGANIZATION

1. Is the agency, department, or firm for which you are responding a:

_____ municipal, county, or other local planning agency
_____ regional planning agency
_____ public works or engineering agency
_____ consulting firm
_____ educational program or department
_____ community development agency
_____ other (please specify) ______________________________

2. If this is a public agency, is its jurisdiction a:

_____ municipality
_____ county
_____ multi-county area (how many) _________
_____ multi-state or national
_____ special district and other (please specify) _______________
_____ does not apply

3. What population is within the jurisdiction of this agency?

_____ under 2,500
_____ 2,500 to 25,000
_____ 25,000 to 100,000
_____ 100,000 to 500,000
_____ over 500,000
_____ does not apply

4. _____ How large is the total full time staff of your department, firm, or agency?

5. _____ How many professionals are currently on the staff of your department, firm, or agency?

6. _____ How many of these professionals are trained at the master's degree level or beyond?

7. _____ How many college-trained planners are on your staff?

8. _____ How many college-trained engineers are on your staff?

ACTIVITIES OF YOUR ORGANIZATION

How significant is the time devoted by your department, firm, or agency to the various planning activities below?

	Time of Major Significance (over 20% of all activity)	Time of Moderate Significance	Time Not Significant
9. Community Development (CD)-related planning	1	2	3
10. social services planning	1	2	3
11. housing analyses	1	2	3
12. planning assistance to neighborhood organizations/advocacy planning	1	2	3
13. designing public works projects	1	2	3
14. transportation planning	1	2	3
15. capital improvements planning	1	2	3
16. river basin/coastal planning	1	2	3
17. 701-type planning	1	2	3
18. zoning/land use control	1	2	3
19. general research and data assembly	1	2	3

How significant is the time devoted by your department, firm, or agency to the specific work functions below?

	Time of Major Significance (over 20% of all activity)	Time of Moderate Significance	Time Not Significant
20. developing preliminary design concepts for public facilities or publicly-supported projects	1	2	3
21. supervising contracts for planning or design work by consultant firms	1	2	3
22. preparing federal and state applications	1	2	3
23. program development and analyses	1	2	3
24. data collection	1	2	3
25. data processing and information systems development	1	2	3
26. updating zoning, utility, and land use maps	1	2	3
27. drafting	1	2	3
28. development and testing of computerized models	1	2	3
29. project reviews, (e.g., A-95)	1	2	3
30. program evaluation	1	2	3
31. environmental impact analyses	1	2	3
32. preparing cost estimates for proposed public projects	1	2	3
33. new construction inspection	1	2	3
34. housing inspection	1	2	3
35. contract consulting/contract research	1	2	3

SKILLS OF URBAN TECHNOLOGIST – DRAFTING AND MAPPING

Please indicate, for each of the following skills (1) how important you consider this skill to the functioning of your agency; and (2) whether your agency's current capability in this skill is adequate, limited, or none.

SKILLS	IMPORTANCE TO YOUR AGENCY					YOUR CURRENT CAPABILITY		
	Essential		Desirable		Not Important	Adequate	Limited	None
	(Please circle one)					(Please circle one)		
36. do line drawings	1	2	3	4	5	Adeq	Lim	None
37. scribe a map	1	2	3	4	5	Adeq	Lim	None
38. do plane table mapping	1	2	3	4	5	Adeq	Lim	None
39. interpret air photographs of land use	1	2	3	4	5	Adeq	Lim	None
40. interpret remote images	1	2	3	4	5	Adeq	Lim	None
41. read a topographic map	1	2	3	4	5	Adeq	Lim	None
42. use a geocoding system	1	2	3	4	5	Adeq	Lim	None
43. develop a land use map	1	2	3	4	5	Adeq	Lim	None
44. develop a land capability map	1	2	3	4	5	Adeq	Lim	None
45. read a blueprint	1	2	3	4	5	Adeq	Lim	None
46. use a typewriter	1	2	3	4	5	Adeq	Lim	None
47. use a programmable desk calculator	1	2	3	4	5	Adeq	Lim	None
48. understand survey notes and terminology	1	2	3	4	5	Adeq	Lim	None
49. perform graphic design, color coding of maps, and charts	1	2	3	4	5	Adeq	Lim	None

SKILLS OF URBAN TECHNOLOGIST – ENGINEERING OR PUBLIC WORKS

Please indicate, for each of the following skills (1) how important you consider this skill to the functioning of your agency; and (2) whether your agency's current capability in this skill is adequate, limited, or none.

SKILLS	IMPORTANCE TO YOUR AGENCY					YOUR CURRENT CAPABILITY		
	Essential	Desirable			Not Important	Adequate	Limited	None
50. take a traffic count	1	2	3	4	5	Adeq	Lim	None
51. analyze traffic count data	1	2	3	4	5	Adeq	Lim	None
52. use surveying instruments to lay out a site	1	2	3	4	5	Adeq	Lim	None
53. calculate sewer flows	1	2	3	4	5	Adeq	Lim	None
54. measure hydrologic flows. . . .	1	2	3	4	5	Adeq	Lim	None
55. take a soil sample	1	2	3	4	5	Adeq	Lim	None
56. analyze a soil sample	1	2	3	4	5	Adeq	Lim	None
57. take and analyze water samples	1	2	3	4	5	Adeq	Lim	None
58. be familiar with the properties of various construction materials, (e.g., insulation, plumbing)	1	2	3	4	5	Adeq	Lim	None
59. interpret a building code	1	2	3	4	5	Adeq	Lim	None
60. conduct a fire safety inspection of a house or building	1	2	3	4	5	Adeq	Lim	None
61. conduct an onsite zoning inspection.	1	2	3	4	5	Adeq	Lim	None
62. lay out a sewer plan	1	2	3	4	5	Adeq	Lim	None
63. build a three-dimensional structural model	1	2	3	4	5	Adeq	Lim	None
64. prepare a cost estimate analysis for a public works project.	1	2	3	4	5	Adeq	Lim	None
65. understand alignments, profiles, and cross-sections	1	2	3	4	5	Adeq	Lim	None
66. tabulate and analyze project bid proposals	1	2	3	4	5	Adeq	Lim	None

SKILLS OF URBAN TECHNOLOGIST – MATHEMATICAL AND RELATED SKILLS

Please indicate, for each of the following skills (1) how important you consider this skill to the functioning of your agency; and (2) whether your agency's current capability in this skill is adequate, limited, or none.

SKILLS	IMPORTANCE TO YOUR AGENCY					YOUR CURRENT CAPABILITY		
	Essential		Desirable		Not Important	Adequate	Limited	None
67. perform algebraic or trigonometric computations	1	2	3	4	5	Adeq	Lim	None
68. interpret a cross tabulation of two variables	1	2	3	4	5	Adeq	Lim	None
69. calculate measures of central tendency and statistical distribution (mean, standard deviation)	1	2	3	4	5	Adeq	Lim	None
70. calculate a correlation coefficient	1	2	3	4	5	Adeq	Lim	None
71. calculate a linear regression	1	2	3	4	5	Adeq	Lim	None
72. interpret correlation coefficients and statistical significance	1	2	3	4	5	Adeq	Lim	None
73. interpret a linear regression equation	1	2	3	4	5	Adeq	Lim	None
74. interpret partial and multiple correlation coefficients	1	2	3	4	5	Adeq	Lim	None
75. interpret the results of a factor analysis	1	2	3	4	5	Adeq	Lim	None
76. use computer statistical packages (e.g., SPSS, Biomed)	1	2	3	4	5	Adeq	Lim	None
77. use computer graphics software package	1	2	3	4	5	Adeq	Lim	None
78. do general programming of computer (Fortran, Cobol, etc.)	1	2	3	4	5	Adeq	Lim	None
79. collect data for an economic base study	1	2	3	4	5	Adeq	Lim	None
80. do basic cost accounting	1	2	3	4	5	Adeq	Lim	None
81. draw a representative sample of a known population	1	2	3	4	5	Adeq	Lim	None

SKILLS OF URBAN TECHNOLOGIST – INDEPENDENT RESEARCH, ORGANIZATION & REPORTING SKILLS

Please indicate, for each of the following skills (1) how important you consider this skill to the functioning of your agency; and (2) whether your agency's current capability in this skill is adequate, limited, or none.

SKILLS	IMPORTANCE TO YOUR AGENCY					YOUR CURRENT CAPABILITY		
	Essential		Desirable		Not Important	Adequate	Limited	None
82. analyze the results of a questionnaire or opinion survey	1	2	3	4	5	Adeq	Lim	None
83. possess a working knowledge of census data and other pertinent informational resources	1	2	3	4	5	Adeq	Lim	None
84. research zoning and subdivision regulations without assistance	1	2	3	4	5	Adeq	Lim	None
85. research without assistance a problem in planning law	1	2	3	4	5	Adeq	Lim	None
86. analyze alternative recommendations for changes in local or state law	1	2	3	4	5	Adeq	Lim	None
87. write a clear and concise report	1	2	3	4	5	Adeq	Lim	None
88. conduct a formal telephone or personal interview	1	2	3	4	5	Adeq	Lim	None
89. speak effectively to a professional group	1	2	3	4	5	Adeq	Lim	None
90. speak effectively to a citizens group	1	2	3	4	5	Adeq	Lim	None
91. present a technical issue to elected officials	1	2	3	4	5	Adeq	Lim	None
92. organize an interagency task force	1	2	3	4	5	Adeq	Lim	None
93. work effectively with citizens groups	1	2	3	4	5	Adeq	Lim	None
94. work effectively with professionals of other agencies and departments	1	2	3	4	5	Adeq	Lim	None
95. work effectively with racial minorities	1	2	3	4	5	Adeq	Lim	None
96. find and understand information in government documents	1	2	3	4	5	Adeq	Lim	None

SKILLS OF URBAN TECHNOLOGIST – ADVANCED ANALYSIS SKILLS

Please indicate, for each of the following skills (1) how important you consider this skill to the functioning of your agency; and (2) whether your agency's current capability in this skill is adequate, limited, or none.

SKILLS	IMPORTANCE TO YOUR AGENCY					YOUR CURRENT CAPABILITY		
	Essential		Desirable		Not Important	Adequate	Limited	None
97. perform an elementary time and motion study	1	2	3	4	5	Adeq	Lim	None
98. prepare a population projection (e.g., cohort survival analysis)	1	2	3	4	5	Adeq	Lim	None
99. conduct a critical path analysis of a scheduling problem	1	2	3	4	5	Adeq	Lim	None
100. assist in cost-effectiveness analyses	1	2	3	4	5	Adeq	Lim	None
101. assist in environmental impact analyses	1	2	3	4	5	Adeq	Lim	None
102. assist in right-of-way analyses	1	2	3	4	5	Adeq	Lim	None
103. do a network analysis of a transportation problem	1	2	3	4	5	Adeq	Lim	None
104. conduct a land use capability analysis	1	2	3	4	5	Adeq	Lim	None
105. make use of a simulation model for transportation or land use planning	1	2	3	4	5	Adeq	Lim	None

KEY SKILLS

Please review your assessment of the skills found on the previous five pages. What three would you consider most important if today you were hiring a technical staff person to support the professionals in your department, firm, or agency?

106. ____

107. ____

108. ____

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APPENDIX D
INSTRUCTIONS FOR MODULE AUTHORS

The staff of the Urban Technology Development Program is pleased that you have expressed an interest in participating in our project's module development phase. A module is a discrete learning unit that will form part of the basic instructional program for the urban technologist. Each module is composed of five parts.

1. Statement of objectives
2. Instruction outline
3. Student reading list
4. Instructional strategies
5. Methods of evaluation

Each of these areas is discussed in succeeding pages of this document. However, before detailing the concept of a module, several constrains should be discussed.

The development of a module should be viewed with three limitations in mind. First, the module should be a self-contained learning sequence for two or four year undergraduates. Authors should assume that a student has no experience or background in the subject matter of the module. Secondly, the basic goal of the technologist development program is to produce "doers." The technologist needs a specific set of skills and capabilities as opposed to a strong conceptual grounding. Conceptual acquisition should be an important element of the module, but it should not be the paramount objective. Finally, the module should be a "cookbook" for the instructor. Most instructors in a technology program will have neither your experience nor expertise. Out of necessity, instructors will have to rely on the materials the author supplies to provide a step by step "how to do it" approach.

Below is the format your presentation should follow:

Statement of Objectives. Our educational advisory committee helped develop the specific objectives for each module (see enclosed materials for the objectives relating to your specific module). Neither we nor they view these objectives as totally sacrosanct. Accordingly, authors should feel free to modify or clarify the statements of the objectives as long as the original intent is maintained.

The statement of objectives should be the initial material in the module.

Instructional Outline. This outline should identify a sequence of topics to guide students toward attainment of the desired objectives. The outline should be detailed to at least the third level. It is not to be detailed to the level of each class meeting, but more along the line of the topics that might be covered during three or four class meetings over a ten week period. Authors may employ detail if they wish.

The outline should be keyed to reference materials for instructors. It should be assumed that no text has been written for the module. In essence, authors are asked to create an instructor's guide by selecting appropriate reference materials. Because institutions participating in the technologist program may have limited library resources, please provide several possible sources. Where appropriate, indicate which of these is the best treatment of the topic (see below for outline format).

SAMPLE

Instructional Outline: Primary Data Collection - Planning

- I. General Considerations
  - A. Introduction
    - 1. Quality of information
    - 2. Primary and secondary data
    - 3. Original investigations
  - B. Approaching a Problem
    - 1. Aims
    - 2. Defining a problem
    - 3. Choosing methods
    - 4. Types of approaches

The best coverage of these topics can be found in:

Daugherty, Richard, *Data Collection*, Science in Geography, No. 2 (London: Oxford University Press), pp. 1 - 12.

Other useful sources on these topics are:

Wilson, A. G., and Kirkby, *Mathematics for Geographers and Planners* (Oxford: Claredon Press, 1975), pp. 1 - 17.

Durrenberger, Robert W., *Geographical Research and Writing* (New York: Thomas Y. Crowell Co., 1971).

- II. Sampling
  - A. Sampling Methods
    - 1. Random sampling
    - 2. Systematic sampling
    - 3. Stratified sampling
  - B. Size of Sample
    - 1. Sampling distribution
    - 2. Confidence limits

Good coverage in sampling is found in:

Reichman, W. J., *Use and Abuse of Statistics* (Baltimore: Penguin Books, 1964).

For applications relating to specific types of sampling see:

Berry, Brian J. L., *Sampling, Coding, and Storing Flood Plain Data*, USDA Handbook, No. 237 (Washington, D.C.: USGPO, 1962).

Hatfield, S. M. and Oorzeska, J. D., "A Sampling Technique for Updating a Quantitative Land Use Inventory," *Highway Research Record* (Washington, D.C.: No. 126), pp. 79-87.

Student Reading List. This should be a list of student reading material keyed to the instructional outline. Readings on this list should be selected with two thoughts in mind. First, students in a technologist program have little or no background in the subject area of the module. Second, most undergraduate students have an aversion to reading. Accordingly, the titles placed on this list should be brief and written at an elementary level. Again, it would be very desirable if authors could provide several possible titles for each topic. Please use the format illustrated below in compiling the student reading list.

SAMPLE

Student Reading List: Primary Data Collection - Planning

I. General Considerations

The best source for students on these topics is found in:

Durrenberger, Robert W. Geographical Research and Writing (New York: Thomas Y. Crowell, 1971), pp. 1 - 36.

A somewhat more rigorous treatment of these topics is found in:

Cole, John P. and King, C.A.M. Quantitative Geography: Techniques and Theories in Geography (London: John Wiley and Sons, Ltd., 1968), pp. 1 - 21.

II. Sampling

Two very readable accounts of sampling are found in:

Hammond, R. and McCullaugh, P. S. Quantitative Techniques in Geography (Oxford: Clarendon Press, 1974), pp. 108 - 133.

and

Daugherty, Richard, Data Collection, Science in Geography, No. 2 (London: Oxford University Press, 1974), pp. 13 - 26.

Instructional Strategies. In this section, authors are asked to indicate what instructional strategies and techniques would be appropriate for each of the major headings in the instructional outline. There are, of course, many ways of presenting materials to students. These include lecture-recitation, problem solving and gaming and simulation. This list is by no means exhausive, rather it is illustrative of methods that might be employed (see below for examples).

Where the problem solving or simulation techniques are suggested, it would be most helpful ifthe authors would supply examples. Ideally, these would be materials that you have employed in your classroom instructional program. One such exercise appears after the suggested format for instructional strategies.

SAMPLE

Instructional Strategies: Primary Data Collection - Planning

A. Introduction

The best approach for the introductory topics in this area is that of lecture-recitation. Students need to realize that data vary greatly in quality. They should clearly understand the differences in primary and secondary data. This is best done by citing several examples of both types and noting that some primary data can become secondary.

B. Approaching a Problem

In helping students learn how to approach a problem, it is important that they be introduced to a systemic method of investigation. The scientific method applied to specific planning or public works problems offers one avenue for introducing students to a logical sequence of research activities. Students should be given an exercise in problem definition and hypothesis formulation. Emphasis should be placed on narrowing the focus of the problem and the development of testable hypotheses.

SAMPLE

Land Use Mapping Exercise

Each student will be assigned two sheets from the Boardman Twp. Tax Maps. You are to make a data collection base map from each plate of the tax maps. This map should be done in pencil and show the following:

1. Streets and street names
2. Lot lines
3. Water courses

The base map is to be prepared by tracing the above information from the tax maps. Both pencils and paper will be supplied. All work in the preparation of the base map should be done in Room 2029. This room will be open at the following times:

Monday	9:00 - 4:00
Tuesday	9:00 - 5:30
Wednesday	9:00 - 4:00
Thursday	9:00 - 5:30
Friday	9:00 - 4:00
Saturday	To be announced

You should complete the drafting of your base maps before May 10.

The next step in the project is the field collection of data. You are to conduct a land use survey of the areas shown on the base map. Record uses in the following categories:

USE	MAP SYMBOL
Residential	
Single Family	SF
Multi Family (low-density - duplex to 6-plex)	MFL
Multi Family (high-density - greater than 6-plex)	MFH
Commercial (retail and service)	C
Wholesale	W
Industrial	M
Transportation and Utilities	T
Public Facilities and Open Space	P
Institutional (churches, social organizations, etc.)	I
Agricultural	A
Vacant	V

You should be able to complete your survey in about four hours. If you have problems in classifying uses, make notes on the problem and consult the instructor. This portion of the exercise should be completed by May 17.

When all data have been collected, it should be transfered to the tax map using the following color code:

USE	COLOR
Single Family Residential	yellow
Multifamily (low-density)	orange
Multifamily (high-density)	brown
Commercial (retail and service)	red
Wholesale	purple
Industrial	black
Transportation and Utilities	blue
Institutional	gray
Public and Open Space	green
Vacant	uncolored

Land use studies usually include not only a map, but a statistical summary of the uses. You are to determine the area in each category of use and the percent each use is of the total area. These data are to be reported in tabular form.

Finally, you are to prepare a two to three page summary (no more) of your findings concerning the land use patterns in the areas you surveyed and mapped. Your base map with field notes, the completed map, and the report with statistical summary should be handed in no later than the time for the final exam, June 10, at 1800.

Methods of Evaluation

In developing a curriculum for the technologist, we think that it is imperative that methods be developed to determine if a student has achieved a particular level of competency in a particular skill. When a student has completed the learning sequence of a module, he should possess new skills and knowledge. How can that competency be tested?

In this segment of the module, authors are asked to suggest and illustrate, where possible, techniques and methods for measuring a student's progress toward achieving the objectives of the module. This may be a collection of materials authors have previously used in their course or it may be some type of project a student should complete.